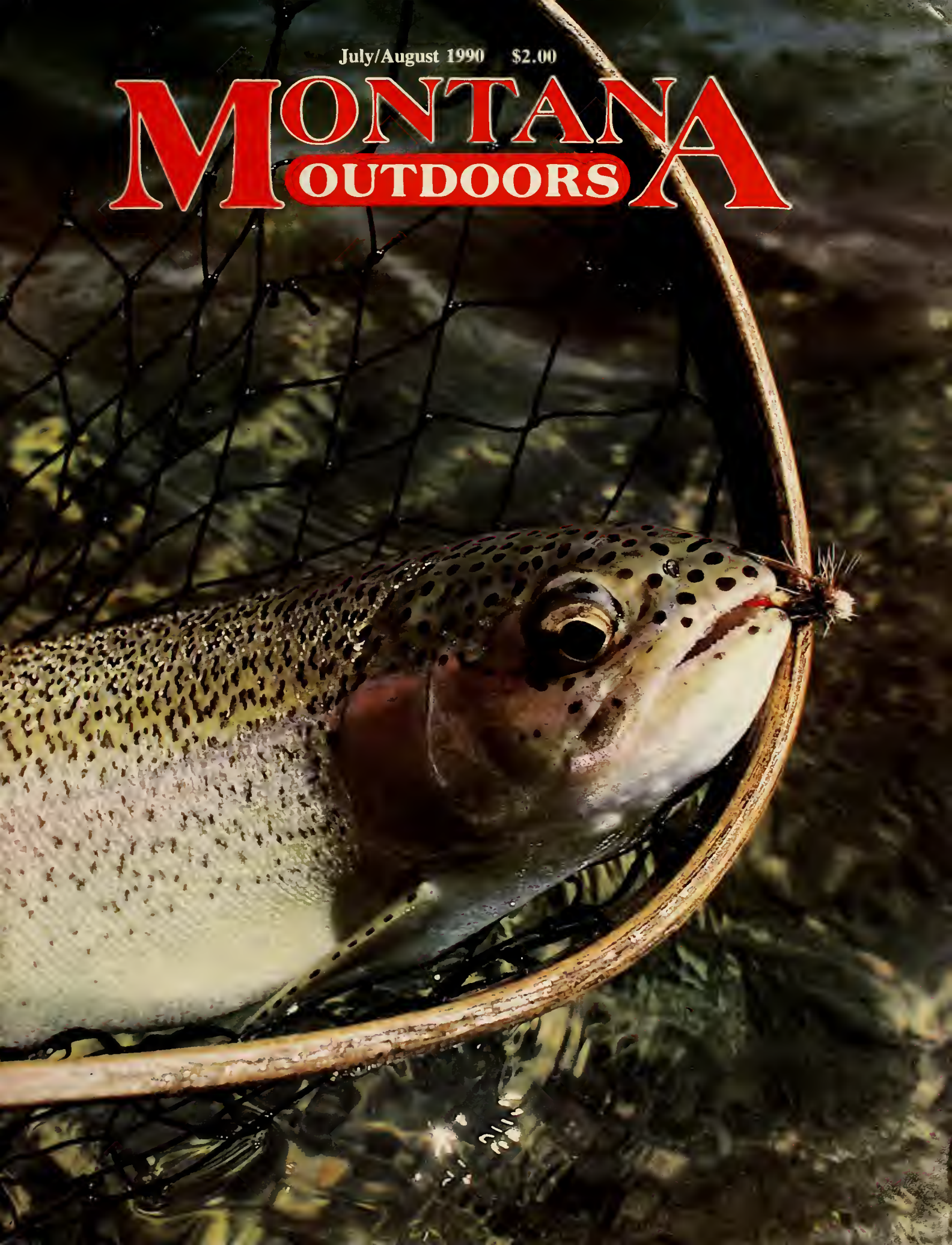
July/August 1990 $2.00

MONTANA OUTDOORS



OUR POINT OF VIEW

WATER—IT NOURISHES US, PROVIDES US WITH POWER, and its rhythmic motion can calm our souls. Without it, crops wither, wildfires rage, and fish and wildlife suffer.

It is no wonder the allocation of water among different users evokes strong emotions in many Montanans.

This can lead to long, bitter conflicts—conflicts that can turn neighbor against neighbor or could potentially divide a state.

Over time, the uses of water have diversified. In recent years, many people have looked to the waters flowing and impounded in Montana to provide recreational opportunities and sustain fish and wildlife. This has led to conflicts with some of the existing water users.

Montana's Legislature had the foresight to see conflicts coming. They have provided some important tools to the people of the state. In 1969, the Legislature established water rights on portions of a dozen blue ribbon streams. In 1973, the Montana Water Use Act established a water reservation system that allowed for the planned allocation of water that was not already put to use. This included the opportunity to reserve water for instream purposes such as water quality, fish, wildlife, and recreational uses. Currently pending is a water reservation on the Missouri River Basin (see page 2) and the upper Clark Fork Basin.

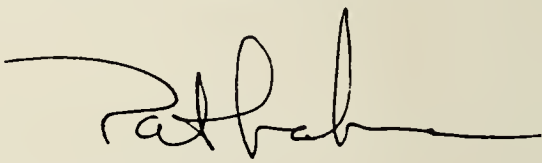
Water reservations cannot affect existing water uses, so in times of water shortage, some streams can still become dewatered. However, water reservations for instream flows can keep the frequency and severity of dewatering from worsening in the future.

The Legislature recognized that existing water users control the majority of available water during low water years in most streams. They provided another tool in 1989 which is a pilot project to allow for the leasing of water in five stream reaches for instream flow purposes. Water rights could already be bought, sold, and transferred for all consumptive uses, but not to leave instream.

CONRAD ROWE

The new water leasing legislation is another in a line of progressive laws that provide an opportunity to allow reasonable people to work out their differences. It will very likely take additional steps in the future before adequate solutions can be achieved.

There are those who think there should be no instream flows and those who want the rivers to run full. If either prevails, it will mean significant social and economic impact. We must continue to use the tools we have and, when necessary, improve upon them to strike a balance.



Pat Graham
Associate Director

Montana Department of Fish, Wildlife & Parks

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Front Cover—Warm-water, cold-water, stream, river, lake, reservoir, flies, lures, shore, wade, troll. Montana offers just about anything an angler could fancy. **Conrad Rowe's** front cover shot of a rainbow trout shows the sort of catch which would make any fisherman proud.

Back Cover—Painted by Livingston artist **Parks Reece**, the back cover piece is titled "Hot Crowmance." It was inspired by **Rand Robbin's** poem, "As the Crow Flies."

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"Rivers are marvelous spirits. Perpetually singing and dancing,
they amble merrily toward the ocean, where they rejoin
their cradle and their grave, lose their identities,
and are mystically transported to the tops of the mountains to begin new lives."

—Constance Elizabeth Hunt, "Down by the River"

DAVE BOOKS

PAUL UPDIKE

Canoeists (top) enjoy solitude and prairie scenery on the 150-mile stretch of the Missouri preserved as part of the National Wild and Scenic Rivers system. The upper Missouri River Basin (above and right) offers superb trout fishing, attracting visitors from throughout the world.

Instream Flow on the Mighty Mo

by Liter Spence

SEAN LOGAN

THE MISSOURI RIVER begins its long amble to the ocean in southwestern Montana, in the shadow of some of America's most rugged mountain ranges. Formed by the confluence of three famous trout rivers—the Madison, Jefferson, and Gallatin—the Missouri itself is a world-class trout fishery in some of its upper reaches. Farther downstream, where a slower, wider, and muddier Missouri winds through limestone cliffs and prairie expanses little changed from the days of Lewis and Clark, anglers seek catfish, sauger, sturgeon, and paddlefish. As might be expected, myriad demands are placed on the Missouri's waters, and wildlife and recreational interests must vie with agricultural, energy, industrial, and municipal uses.

Although agriculture continues to be the major industry in Montana, recreation and tourism add millions of dollars to the state's economy each year and provide jobs for thousands of Montanans. In the past, little attention was given to maintaining adequate flows in Montana's rivers to sustain fish and wildlife. But times have changed. Thanks to passage of the Montana Water Use Act in 1973, fish and wildlife interests can now legally compete for water allocations, and state agencies can request reservations of instream water to protect fish and wildlife habitat.

Accordingly, the Montana Department of Fish, Wildlife & Parks (FW&P) has requested instream flow reservations in the Missouri River Basin above Fort Peck Dam to protect fish and wildlife (see map). This article describes the water reservation process, how it relates to past and present Montana water law, how fisheries have been affected by these laws, and why instream water reservations are needed in the Missouri River Basin to maintain these resources.

The Setting

The Missouri River Basin occupies a large portion of Montana east of the Continental Divide. Headwater tributaries originate high in the mountains, where vast tracts of publicly owned forest, range, and park land dominate the landscape. Melting snow begins its downstream journey every spring, tumbling precipitously out of the mountains to the valley floors. Gaining momentum from each new creek, the rushing waters flow through timbered canyons and semi-arid valleys, passing sagebrush, grasslands, and agricultural fields where they are used to irrigate hay and grain crops. Gradually slowing in speed but gaining in volume, these waters form the Madison, Jefferson, and Gallatin rivers, which join at Three Forks to form the majestic Missouri River. The Missouri then meanders through a wide agricultural valley for 35 miles before it enters Canyon Ferry Reservoir just east of Helena. The drainage area above Canyon Ferry Dam encompasses about 15,000 square miles.

From Canyon Ferry Dam to Fort Peck Dam, the Missouri Basin drains approximately 42,000 square miles of the Montana landscape. The first 150 river miles are interrupted by seven hydropower dams operated by the Montana Power Company. Downstream from Morony Dam, the lowermost hydro facility located east of Great Falls, the Missouri flows uninterrupted for about 200 miles to Fort Peck Reservoir. This is the longest remaining essentially free-flowing section of the river, and much of the landscape remains very similar to that observed by Lewis and Clark when they traversed the area in 1805: "We are now about to penetrate a country at least 2,000 miles in width in which the foot of civilized man had never trodden; the good or evil it had in store for us was for experiment yet to determine...." (from Meriwether Lewis' journal on his departure from Fort Mandan—April 7, 1805).

As the two adventurers and their party struggled upstream, they could not have imagined that it would one day be necessary to legally protect the natural and historic integrity of this section of the Missouri River. Yet, in 1976, Congress designated the 150 miles of river from Fort Benton to the Fred Robinson Bridge as part of the National Wild and Scenic Rivers system to protect it from development.

The Fisheries

The Missouri supports a large and

diverse fisheries resource. It contains 53 of the 80 species of fish known to occur in Montana, ranging from rainbow, brown, and cutthroat trout found in the colder headwater streams to shovelnose sturgeon, sauger, channel catfish, paddlefish, and pallid sturgeon found in the middle Missouri River above Fort Peck Reservoir. Montana's Missouri River paddlefish population is one of only six populations remaining in the Mississippi-Missouri river systems. The pallid sturgeon may soon be listed as a federal endangered species due to its extremely limited numbers.

The recreational opportunities provided in the upper basin (above Canyon Ferry Dam), particularly the trout fishing, are nationally acclaimed, attracting visitors from throughout the world. The upper basin contains more than 436 miles of Class I (blue ribbon) and Class II (high value) stream fisheries, all of which are populated with wild trout. Among this group of world-renowned waters are the Madison, Gallatin, Big Hole, and Beaverhead rivers. About 43% of all non-resident fishing pressure in Montana occurs in the upper Missouri Basin, a testimony to the outstanding quality of the area's fishery resources.

Downstream from Canyon Ferry Dam, the 35-mile blue ribbon section of the Missouri River between Holter Dam and the town of Cascade is second only to the Madison River in having the highest angler use of any trout stream in the state.

Several fish species of "special concern" inhabit the Missouri Basin above Fort Peck Dam. These include the westslope cutthroat trout, Arctic grayling, pallid sturgeon, paddlefish, sturgeon chub, sicklefin chub, and northern redbelly dace/fine-scale dace hybrid. The westslope cutthroat and Arctic grayling are the only trout native to the Missouri Basin in Montana. Before settlement, they were widely distributed above the present-day city of Great Falls. Today, however, genetically pure westslope cutthroat are restricted primarily to headwater areas, where they survive in isolated populations that number from a few hundred to a few thousand individuals. The last substantial stream-dwelling Arctic grayling population in the lower 48 states now exists only in portions of the Big Hole River drainage, but it, too, is in jeopardy. The decline of both species has been due to a number of factors, including habitat loss, dewatering, sedimentation, water quality deterioration, and introduction of non-native species such as rainbow, brown, and brook trout.

FRED NELSON

Periodic dewatering of many Missouri River tributaries, like the Big Hole River pictured here, adversely affects trout populations and fishing opportunity. Although instream flow reservations do not affect existing water rights and uses, they can keep dewatering from getting worse.

FRED NELSON

Fish Habitat and Water Needs

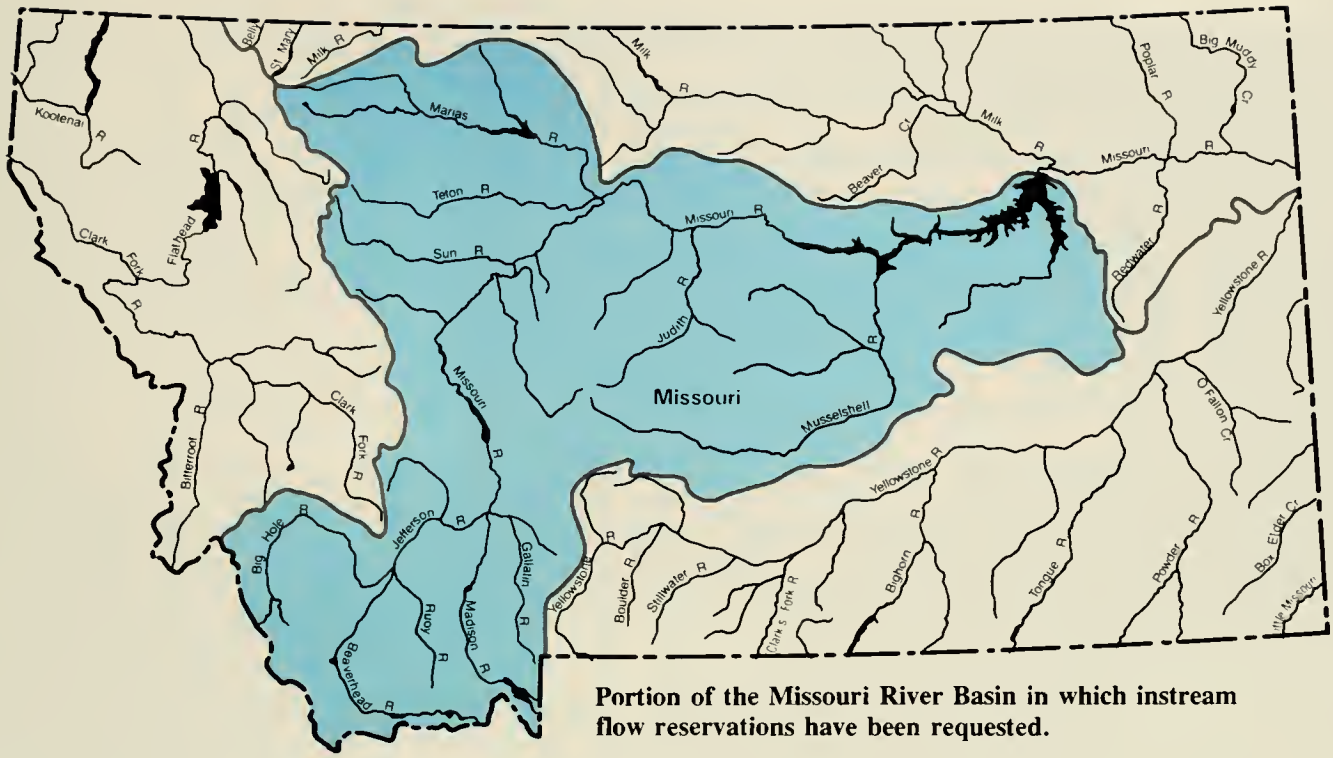
Good habitat is vital for protection and enhancement of the diverse fisheries resources we are fortunate to have in this state. The three fish habitat components needed to provide good stream fishing are: (1) the physical habitat, (2) the quantity of water available to fill the physical habitat, and (3) the quality of that water. Instream flows provide the water quantity component of stream fish habitat. However, for more than 100 years, flows have gradually been depleted from many streams in the state, primarily due to agricultural withdrawals.

Instream flows are necessary to maintain adequate living space for fish, to provide spawning areas and places where young fish can grow, to protect food-producing areas, to maintain water quality, to help provide streamside vegetation, and, in some areas, to protect "species of special concern." Maintaining good fishing opportunities depends on maintaining good habitat conditions. Thus, instream flows for fish and wildlife are vital to the economic well-being of the state.

The Dewatering Problem

In 1892, Julian Ralph, a noted 19th-century writer, newspaper reporter, and editor, provided this vision of Montana's future in a *Harper's* magazine article: "I see a vision of Montana in the future, yet in the lifetime of the young men of today. I see half a dozen such mining centres as Butte, and they are all such noble cities, set with grand buildings, boulevards and parks....I see scores of great valleys, and other scores of little ones, all gay with the blossoms of fruits and grain, supporting a great array of prosperous farmers. I see tens of thousands of rills of water embroidering the green valleys, and I dream that the men who need that water to make the earth give up its treasures are not obliged to pay more than the conduits cost, merely to enrich a set of water lords who seized the streams when no one was there to protest. I see the brown hills and mountainsides of eastern Montana dotted with cattle and sheep....I see in western Montana sawmills and mines that were not dreamt of in 1892. I see carloads of fruit and vegetables and barley malt rolling into the cities, and out to other states.... Montana is fulfilling her destiny. She is one of the most populous and opulent members of our sisterhood of states."

Although perhaps not all of Julian Ralph's expectations have been met, a good part of his vision of Montana has come true. Agriculture has traditionally been and continues to be a dominant feature of the Montana landscape and economy. Particularly in the western half of the state, irrigated farming is a principal means of livelihood. The "...tens of thousands of rills of water embroidering the green valleys..." produce a large share of individual agricultural income that enters the overall state economy. But, use of those same rills of



Portion of the Missouri River Basin in which instream flow reservations have been requested.

water has caused dewatering problems in many of Montana's fishing streams.

During the early settling of the West, recreational water use was not an economic consideration. Today, however, recreation and tourism are major components of Montana's economy. In a study conducted by University of Montana researchers between April of 1988 and March of 1989, over 2 million non-resident traveler groups, representing an estimated 5.1 million visitors, were surveyed. In spending a total of $658 million, these visitors helped provide 22,500 travel-generated jobs and contributed $367 million in salaries and wages to Montana workers. The total economic impact was more than $1.4 billion. Forty-eight percent of the visits took place from July through September. Approximately two-thirds of Montana's non-resident fishing pressure occurs during this time.

Many recreational benefits are provided by the rivers and streams of the Missouri Basin where fishing is unquestionably a highly valued commodity. An economic study by John Duffield, professor of economics at the University of Montana, and others determined expenditures by resident and non-resident cold-water fishermen to be $99.7 million per year ($52.4 million on streams and $47.3 on lakes in 1985 dollars). They further determined the total net economic value (what fishermen would be willing to pay over and above their actual expenditures) of cold-water stream fishing in Montana to be $122 million per year (1985 dollars). Remarkably, almost $51 million per year—or 42% of the statewide total—was attributed to streams and rivers in the basin above Canyon Ferry Reservoir.

Of the 45 cold-water streams and/or stream reaches evaluated by the Duffield study, three of the most highly valued rivers in the state were in the upper Missouri Basin. The Madison was the most valuable river in Montana ($17,509,000 per year). The Gallatin was the third most valuable stream ($9,722,000 per year), and the Big Hole was fourth ($5,201,000 per year). Only the upper Yellowstone River ($10,905,000 per year) was more highly valued than the Gallatin or Big Hole rivers.

In the middle Missouri River Basin between Canyon Ferry Reservoir and Fort Peck Dam, the net economic value of stream fishing was estimated at $11,478,000. Approximately 9% of the total fishing value of all streams in the state was derived from streams in the middle Missouri Basin. Together, streams in both the upper and middle Missouri basins accounted for about 51% of the total statewide fishing-related values.

Water Law and Water Reservations

The "doctrine of prior appropriation" (first in time, first in right) is the foundation of Montana water use and has been for more than 100 years. Water, under the doctrine, is dispensed on a first-come, first-served basis. Before enactment of a new water law in 1973, Montana had no statute allowing instream flows to be systematically secured for fish and wildlife. Two major obstacles prevented this instream flow protection: First, water could only be appropriated for a "beneficial" use, and fish and wildlife were simply not recognized by law as beneficial uses of water. Second, before water could be appropriated for a beneficial use, it had to be diverted from the stream.

The 1973 Montana Water Use Act overcame these two problems. It specifically defined fish and wildlife as a beneficial use of water and it authorized appropriation of water for instream purposes (as well as for other uses) under the concept of water "reservations." No longer would it be necessary to divert water before it could be put to

DAVE BOOKS

Water-based recreation and tourism add millions of dollars to Montana's economy each year, making stream flow protection a vital concern.

beneficial use.

Water reservations were seen as a means of allocating water for current and future beneficial uses so that Montana would have a solid basis for participating in any future apportionment of water among the 10 Missouri River Basin states. In other words, in any future attempt to divide up Missouri River water, Montana would be able to show it was using, or intended to use, the water allocated by its reservation system. The water reservation process is the only mechanism available for allocating water among competing uses and, as such, is an integral part of Montana's water policy.

Water reservations cannot affect the existing water rights of any water user. The prior appropriation doctrine provides that senior water right holders have priority of water use. Only water users who obtain permits to appropriate water after the reservations are established can be affected by those reservations. Thus, it is apparent that instream reservations can only maintain the status quo of stream flow. Reservations do not create any new water. If a stream has a low flow problem now because of current water use, the reservation process will not improve that condition. However, it can keep dewatering from getting worse if new diversionary uses are granted, since those uses would be affected by the reservations under the "first in time, first in right" principle.

The Reservation Process

To receive a water reservation, a qualified entity, whether it is FW&P, a state conservation district, or a federal agency, submits an application to the Board of Natural Resources and Conservation. The Department of Natural Resources and Conservation (DNRC) then prepares an environmental impact statement on the reservation requests. Following this, a contested case hearing (which is similar to a trial, but without a jury) is held where the pros and cons of the requested reservations are debated. The board then determines whether to grant the reservation requests. To date, the only approved reservations in Montana are those granted in the Yellowstone Basin in 1978.

Parties seeking water reservations in the Missouri Basin above Fort Peck Dam were required to file their applications by July 1, 1989. The board received applications from 18 conservation districts, 18 municipalities, FW&P, the Montana Department of Health and Environmental Sciences, the U.S. Bureau of Reclamation, and the U.S. Bureau of Land Management. The DNRC is currently preparing an environmental impact statement for these applications. Following the contested case hearing, the board has the option to grant the requested reservations in full, grant them in part, or deny the applications entirely. The board must make its decision by July 1, 1992.

Applications for the Missouri River Basin below Fort Peck Dam, including the Little Missouri River Basin, must be submitted by July 1, 1991, and will be the subject of a separate proceeding. Applications are also pending for the upper Clark Fork Basin in western Montana.

Once granted, instream flow reservations do not have the same security as permits for diversionary uses. Unlike diversionary water rights, water reservations must be reviewed at least every 10 years to determine if the objectives are being met. If objectives aren't being met, the board can extend, revoke, or modify the reservations. In addition, water may be reallocated every five years if other qualified applicants can demonstrate a better use for the water. A 1979 amendment to the 1973 Water Use Act prohibits the board from granting instream flow reservations that are greater than 50% of the average annual flow on a gauged stream, thus at times limiting flows required for fisheries.

Toward the Future

Because water use pressures will continue to grow on streams in the Missouri River Basin, instream reservations are necessary to preserve fishing and related recreational opportunities. In some parts of the basin, these opportunities are already restricted by current water use. Yet, not everyone believes water should be left to flow in streams if it can be put to use on the land, particularly if that water leaves the state. Some persons believe instream flows will tie up water which should be used for agricultural, mining, or other diversionary purposes. However, the Missouri River and its tributary streams are diverse and valuable recreational assets, both to the residents of Montana and to out-of-state visitors. Recreation and tourism help diversify the state's economy and contribute substantially to its economic base. Instream flows are essential to ensure the continued health of this sector of the economy, and to preserve the fish and wildlife values that play such an important role in Montana's traditional way of life.■

Crows and Ravens:

BRAINS OF THE BIRD WORLD

by Deborah Richie

LIKE PINE SQUIRRELS IN A FOREST OR RAINBOW TROUT IN A STREAM, the sight of ravens and crows flapping across a Montana landscape can only be called—common. In fact, the crow has earned its place as one of the three most recognized birds in the country. Yet, researchers seeking to learn as much as they can about two of the smartest birds in the avian kingdom are still baffled by these long-lived species.

The American crow, *Corvus brachyrhynchos*, and the larger common raven, *Corvus corax*, join the cast of Corvids (Latin for

common raven: ALAN G. NELSON

crow), known collectively as the most intelligent bird family. Eight of the 17 Corvid species in North America prosper in Montana: pinyon jay, Steller's jay, gray jay, bluejay, Clark's nutcracker, black-billed magpie, American crow, and common raven.

These species possess the largest cerebral hemispheres relative to body weight of any bird species, and their complex behavior patterns support this physical evidence. The insult "bird-brained" spirals into a compliment when speaking of Corvids. For example, they store surplus food in ingenious locations. Yellowstone National Park bird biologist Terry McEneaney observed an intent raven at the edge of a stream chock full of spawning cutthroat trout. The opportunist plunged into the water, yanked out a cutthroat, pecked the fish apart, and then cached all the pieces under various buffalo chips.

Crows can communicate in 23 different calls, mimic English, and count to three or four. They have learned to break clam and walnut shells by dropping them from a high spot onto highway pavement. Montana natural history writer David Quammen has developed his own theory on these black, iridescent birds: "Crows are bored. They suffer from being too intelligent for their station in life."

Ravens cruising the thin air surrounding Denali (Mount McKinley) in Alaska have quickly discovered a new food resource—the marked caches of mountaineers. They have dug as far as three feet down to unearth the bounty.

CORVIDS HEAR WELL, SEE WELL, AND POSSESS A REPERTOIRE OF CALLS to rival any songbird, if not in melody, certainly in variety. Listen to crows. The familiar "caw caw" may transpose into a gentle, whispering song.

All Corvids play incessantly. Crows sometimes engage in a rough and tumble tag. One picks up a pebble and flies from tree to tree; its companions chase it until the pebble bearer drops the stone. Naturalist Edwin Way Teale described ravens nimbly snatching in midair bread crumbs tossed from lighthouse windows by idle attendants.

Look for ravens soaring on wind currents throughout most of Montana in any season. Their wings are pointed, tails wedge-shaped, and throats shaggy. Largest of songbirds, at a glance a raven may be confused with a hawk. Crows, in contrast, are smaller and flap more than soar. Their bills and necks appear slender, wings splayed, and tails square. During winters in Montana, many crows migrate south to milder climes. Where ravens tend toward caution around people, crows are gregarious and even nest in city trees.

Ravens and crows share the general family characteristics of Corvids. Yet they are striking in their differences—physical, behavioral, and even their reputations in myth and folklore.

"QUOTH THE RAVEN, NEVERMORE," penned Edgar Allan Poe. In so doing, he etched a reputation of unfathomable darkness for this bird.

Even before Poe's famous words, references to the raven are scattered throughout literature. William Shakespeare's "Othello" includes this line: "the raven o'er the infected house, Boding to all."

To the Native Americans of the Pacific Northwest, the raven was a god that brought life, order, and light to the planet. Yet, the raven also played the trickster who stole the light from its keeper and forced rivers to run in only one direction after the bird god decided life was too easy for earth's inhabitants.

In Montana, the Crow Indians once had a Raven Society, one of several such honorary clubs. According to tribal stories, performers of raven dances painted themselves red and wore stuffed raven skins for necklaces, the tail feathers fanned across their shoulders.

Members of the Lewis and Clark Expedition documented ravens in the culture of the Teton Sioux. William Clark described the "soldiers" who maintained order in camp: "They are known generally by having their bodies blacked but their distinguishing marks are...two or three stuffed raven skins so fixed on the small of the back...that the tails stick horizontally off from the body."

Perhaps it is the unsurpassed ability of ravens to revel in the harshest of weather that has earned them so much attention. Canadian nature writer R.D. Lawrence called them the toughest birds in the Yukon: "I have seen them flying nonchalantly, high in the air, when the ground temperature was down to 60 degrees below zero. I have watched them land at a wolf's kill while the big predators were busy feeding, the birds biding their time as they strutted through the snow, then darting in to grab some morsel right under the nose of a big timber wolf...."

Yellowstone's McEneaney saw a peregrine falcon swoop down on a blue-winged teal; a raven appeared out of nowhere to yank the teal from the peregrine and flew off with its loot to a thick stand of willows. "They're pretty smart," he says. "They get what they want."

But how exactly do ravens succeed so well? How can they manage to thrive everywhere from the Arctic Circle to the Central American mountains?

Biologist Bernd Heinrich of the University of Vermont set out for the deep Maine woods in 1984 to discover if he could unearth at least one key to their success: Do common ravens let other ravens know where they have found a food bonanza? If so, how and why? Five years later, he published "Ravens in Winter" which reads like a detective adventure in biological research.

Time after time, Heinrich would think he was nearing proof of a hypothesis, only to find something impossible to explain. Every experiment and observation appeared to yield conflicting information, pointing to a more elaborate social structure than he had ever imagined. Heinrich's research revealed that raven courtship may last for several years (ravens mate for life) and that only juveniles in flocks succeed in sharing a carcass located within a mated pair's territory. He was also willing to endure extremes to join the raven's world: "January 2....After a few hours of sleep I'm up again, this time early enough to build a fire, warm myself and have a cup of coffee, and still be atop a spruce before dawn....No stars are visible, and the sky does not lighten much even at dawn. Puffs of breeze soon sway my lofty perch above the forest, and a few tiny snowflakes whisk by. By seven there

American Crow

Habitat: open forest, wooded river bottoms, orchards, agricultural and suburban lands. Generally avoids dense coniferous forests and deserts.

Range: in Montana, present in 21 counties, mainly from late March to October, with a few overwintering in the south. Breeds widely throughout Montana.

Nest: in or near crotches of trees 25 feet and higher in open forests. Nest well built with branches and twigs, nest bowl lined with bark, plant fibers, mosses. Clutch size three to seven; eggs blue-green to olive green, spotted. Incubation by both sexes, 18 days. Young fly when 28 to 35 days old. Eggs hatch from end of April to end of June.

Age: 20 years or more in captivity, and an estimated 6 to 7 years in the wild.

Feeding habits: eats insects, snails, frogs, snakes, eggs, clams, carrion, corn, fruit.

Common Raven

Habitat: often found in high mountains and forest, especially where cliffs or bluffs offer nesting spots. Will also use tall conifers for nesting.

Range: year-round resident mostly in western, southern, and central Montana (22 counties). Will roam high into alpine tundra areas and into sage and grasslands, where it scavenges for carrion. In Montana, breeds and mates primarily in western Montana.

Nest: crotches of coniferous trees 45 to 80 feet up, or on well-shaded cliffs or rock crevices. Nest is two to three feet across and made of bulky branches, deep cup in center lined with bark, animal hair, mosses, grasses. Clutch size three to seven; eggs green-gray, light green, spotted. Incubation by female 18 to 20 days. Male feeds her on nest. Both parents feed young. Young fledge 35 to 42 days after hatching. Eggs hatch from early April to mid-June.

Age: in captivity, 25 years or more; in the wild, an estimated 6 to 7 years.

Feeding habits: scavenger of carrion, also eats frogs, worms, crabs, eggs, fish, rodents, insects, berries.

More About Ravens and Crows

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are more flakes, and the light puffs have changed to intermittent gusts. Now I'm shivering so violently that the tree is not only swaying but vibrating. I'm near the top, where the diameter at my feet is about three inches, and I can almost touch the top of the perhaps 100-foot-tall tree. I am not worried about the tree being strong enough to hold my 160-pound body, but I am concerned about becoming stiff from the cold and too weak to hold with one hand and take notes with the other. But I'm determined to stay, because the ravens have started to arrive...."

Another researcher, George Brady of the Washington Department of Wildlife, banded more than 400 ravens between 1983 and 1990, as well as wing marking birds in 1989. He is trying to find the migration and wintering areas for ravens in north central Washington. His results also led to further research and wing tagging. He writes of his project in February 1990: "In 1989, I tagged 75 birds, all juveniles in nests, and found that almost all the marked birds left the entire area within a week of fledging....I was amazed that all these juveniles left so soon, but within a couple of weeks after the end of the nest season, new birds started coming in, and several hundred ravens wintered in the area, but no marked birds."

American crow: JAN L. WASSINK

"Crows are bored. They suffer from being too intelligent for their station in life."

These flashy fliers which brave Montana winters have mastered survival in ways that continue to outsmart all who strive to study them.

IN CHEYENNE LEGEND, THE CROW AND THE MAGPIE WON A RACE against such mighty competitors as the buffalo, deer, elk, and antelope. To prepare for the race, each animal painted itself in its favorite colors. All the animals chose bright, beautiful hues, but the magpie and crow were left only with white earth and charcoal. These two birds in modest garb lasted all day in the race. The deer grew so tired that blood flowed from its nose and stained rocks and soils across the land. In honor of the victory of magpie and crow, the Cheyenne decided they would never feast on either species.

With the settling of the West, a different view of crows, magpies, and ravens also emerged. Poisoned carcasses of bison set out to lure in wolves became death traps for thousands of ravens. Corn farmers, in particular, targeted crows as vermin.

Crows fared little better in the hands of fish and wildlife agencies during the 1930s, '40s, and '50s. In an era when wildlife fell into one of two camps—good or bad—crows were considered not just bad, but evil, marauders responsible for wiping out countless nests of ducks, pheasants, grouse, and other "good" birds. Agencies encouraged the killing of crows, with some even sponsoring crow-killing contests. In 1949, North Dakota's annual crow control contest accounted for 34,225 dead crows. In 1972, an amended Migratory Bird Treaty Act added ravens and crows to the list of protected birds. According to federal statute, crows may be shot when found "committing or about to commit depredations" on crops, livestock, or wildlife or when concentrated in high numbers so as to be a nuisance.

A reputation for damaging farm crops, as well as raiding nests of songbirds is somewhat undeserved, since insects, earthworms, carrion, and even fruit compose a large portion of a crow's diet.

The impressive communal roosts of thousands of crows set them apart from ravens. Ravens also roost together—but never in such huge numbers. The system makes sense for the smaller, more vulnerable, crows. When a great horned owl discovers a huge crow roost, the chance of being the unfortunate individual nailed by an owl may be as small as one in 100,000. Crows actually chase owls and hawks away from the roost; if left to face such formidable predators alone, a crow would probably flee.

The expression, "straight as a crow flies" comes from the crow's habit of flying directly to the roost.

Montana lies at the edge of the crow's winter range, so they winter only in the state's southern valleys. Crows form flocks before heading south in mid-September and then return in March to wooded river valleys to breed. Courting males bow, dance, and feverishly offer nesting material to potential female mates. Once paired, they sometimes stroke each other with their beaks. The tender scene is accompanied by low "cr-r-r-ucks" and whispers.

Crows are smart and perhaps as Quammen suggests—bored. "See them there," he writes, "lined up conspiratorially along a fence rail or high wire, shoulder to shoulder, alert, self-contained, missing nothing, feeling discreetly thwarted. Waiting, like an ambitious understudy for their break."

Watch crows playing tag. Count their calls. Search for their bulky stick nests in the crotch of a tree. Take advantage of the commonness of crows to find the uncommon. We may start wondering who's studying whom.■

TIP-MONT Helps Put the Crunch on Poachers

Only 65 field game wardens patrol Montana's 142,138 square miles. That gives each warden about 2,256 miles to cover—obviously an enormous job. With the rise of poaching as a big business in Montana and other states, our wardens are under even more pressure to protect the state's valuable natural resources. TIP-MONT is one way concerned citizens can help wardens with this immense task.

The Montana Legislature passed the TIP-MONT program in 1985, allowing the Montana Department of Fish, Wildlife & Parks to set up a toll-free report hotline. Citizens can call in to report big game poaching and other violations of fish and game laws. Callers can remain anonymous, do not have to testify, and they may receive a reward for their tip.

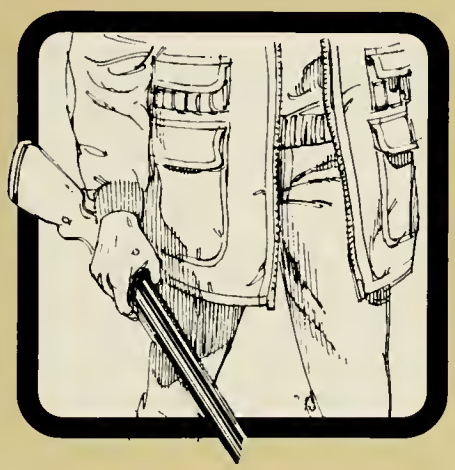
The fish and wildlife crimestoppers board controls the reward program. The board has five members: a FW&P game warden, a member of a conservation or wildlife organization, a person active in agriculture, a member of the public at large, and an appointee from the Fish and Game Commission. The board determines the amount of cash that will be awarded when information is given leading to an arrest or a citation.

The board issues a reward in most cases that go before it. Tippers have already received $7,300 through the TIP-MONT program this year (July 1989 through February 1990). The board has reviewed 30 cases.

One case involved a man from Pennsylvania who illegally bought an elk tag for the Gardiner late elk hunt. With the help of state game wardens and the Belgrade police, federal agents arrested him at the airport after the arranged hunt. He was fined approximately $13,000.

"Not harsh enough," you say? After his initial court appearance, the state of Wyoming extradited him for poaching violations he had allegedly committed there.

Another case, now in court, involves the alleged illegal taking of 32 antelope in southeastern Montana. Bail for the defendants, who face four felony and 14



misdemeanor counts, was set at a total of $27,000.

These results prove that TIP-MONT is working for Montana.

Since 1985, response to TIP-MONT has been gratifying. Elmer Davis, program manager in FW&P's Enforcement Division, said the number of calls this year will exceed 500, a large increase over the 59 calls received in 1985. TIP-MONT is a "great way for citizens to get involved in the protection of our natural resources," he said. Davis also stated that prevention is more important than just turning people in. "Most people don't even mention the reward," said Davis. "Knowing that there are people who care enough to call might change a poacher's mind before he or she commits a crime."

The TIP-MONT hotline is open to all callers. If you witness a violation or have some reliable information on a supposed violation, make the call. However, don't be discouraged if results are slow. Enforcement officers must spend more of their time on what appear to be the most serious violations. Your call, however, will not be ignored.

Help put the crunch on poaching. If you have a tip, call **1-800-TIP-MONT (1-800-847-6668).** The TIP-MONT program also accepts tax-deductible cash donations; they help pay rewards and fund operation of the program.—*John Amoroso, intern, Conservation Education Division*

FW&P Helps Disabled

The Department of Fish, Wildlife & Parks seeks comment on a plan to remove many of the physical and administrative barriers that might have prevented disabled Montanans from taking part in outdoor activities.

Copies of the proposed "Handicapped Accessibility and Transition Plan" to improve access for the disabled to the department's recreation sites and programs are available at all FW&P regional offices and at the Helena headquarters.

Beginning in April, open houses have been conducted at various locations around the state so department employees can answer questions and receive public comment about the program. For additional information, contact Field Services Division, Department of Fish, Wildlife & Parks, 1420 East Sixth Avenue; Helena, MT 59620 (406/444-2602).

DU, BLM: Joint Effort Reflects Cooperation

Representatives of Ducks Unlimited (DU) and the U.S. Department of the Interior's Bureau of Land Management (BLM) signed a Memorandum of Understanding that provides a foundation for the cooperative implementation of strategies designed to assist in achieving the goals of the North American Waterfowl Management Plan.

The two agencies will work together to maximize waterfowl habitat potential on portions of 272 million acres of land managed by the BLM. Of this, approxi-

mately 177 million acres is located in 10 western states. DU and BLM are involved with a number of projects in Montana, including: Big Lake, Stillwater County; Tarawa Reservoir, Phillips County; Custer Creek Reservoir, Prairie County; Centennial Valley, Beaverhead County; and Wards Dam, Valley County.

Habitat will be enhanced through development, construction, reconstruction, and other maintenance. Where feasible, restoration of wetlands and adjacent uplands will be of high priority.

"Ducks Unlimited was extremely pleased to sign this memorandum with the BLM. This joint effort reflects the cooperative spirit vital to the success of the North American Waterfowl Management Plan. By pooling collective resources and strengthening the bonds of partnership, we can do much toward positively impacting the waterfowl resource and wetlands nationwide," said Matthew B. Connolly, Jr., executive vice president of DU.

Waterfowl are priority species in many BLM habitat management plans. Last year, BLM officials approved a strategic plan, "Waterfowl Habitat Management on Public Lands; A Strategy for the Future," encompassing 20 million acres of wetlands. This plan identifies a number of resource opportunities and actions necessary to accomplish national-level waterfowl goals and objectives outlined in "Fish and Wildlife 2000."

DU, a private, nonprofit wildlife conservation organization, has, since initiating its U.S. Conservation Program, completed 370 waterfowl habitat projects nationwide, involving over 350,000 acres. In 1984, DU had signed a less specific Memorandum of Understanding with the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the BLM to lay the groundwork for its wetland habitat program on public lands in the United States.

"Ours is a natural alliance," Connolly said. "DU and the BLM are both committed to supporting habitat initiatives that will best benefit waterfowl. The vast BLM lands will provide us abundant opportunities to do just that."

DU personnel will meet with BLM state directors to review the status of ongoing projects and provide advice, counsel, and engineering expertise on wetland areas selected for cooperative enhancement. DU will also help to inventory wetland habitat to determine present condition and management potential on 12 million acres within 170 wildlife habitat management areas.

Commissioner, Employees Receive Kudos

F.W. "Bill" Howell, Fish and Game Commissioner from West Yellowstone, has been named as one of "25 Who Made a Difference" by *Snowmobile Magazine*. Winners were honored at a ceremony in Minneapolis. They were selected for their outstanding contribution to the sport and industry of snowmobiling and were recognized as "true leaders of snowmobiling." Howell is owner of Yellowstone Tour and Travel and past president of the Montana Snowmobile Association.

FW&P biologist **Mike Frisina** has been honored by the U.S. Forest Service as one of the nation's top range managers. He was commended for developing and implementing a cooperative grazing management program at Fleecer Mountain Wildlife Management Area. Frisina manages Fleecer Mountain and Mount Haggin Wildlife Management areas in southwestern Montana. His award was presented at a ceremony in Washington, D.C.

Dave Mott, administrator of the department's Management Services Division, has received an Excellence in Performance Award from Governor Stan Stephens. Mott was nominated for the award by FW&P Director K.L. Cool. Cool cited Mott's fiscal and administrative skills in improving internal controls and accounting procedures. Cool also praised Mott's work with the once controversial big game licensing procedures.

Also receiving the Excellence in Performance Award were **Shirley Broyles**, administrative assistant in the Region 4 (Great Falls) office, and **Debbie Cheek**, parks operations specialist in Region 4. In nominating them, Cool praised their efforts in organizing, training, scheduling, and developing a volunteer staff program for the regional office. During 1989, over 70 volunteers assisted the department with various chores.

Just a Couple of Questions

You just finished a day fishing on one of Montana's trout streams. While stowing your gear, you reflect on your experience at the access site and notice someone approaching with a clipboard and looking as though he wants to talk. Is it a game warden? A fisheries biologist? A tourist?

This summer, it's probably a representative of the Montana Board of Outfitters, and he *does* want to talk: Did you encounter floating guides or outfitters on your trip? Too many of them? Are you an outfitter or guide? Did you catch anything? Did you release it even if you didn't have to? Did you have a good time, or did you experience an unpleasant incident with another fisherman or stream user? How was the fishing?

The person asking the questions has been hired by two Montana State University professors, under contract with the Montana Board of Outfitters, to conduct a survey on some of Montana's most heavily fished rivers. This is your opportunity to tell the Montana Department of Commerce, and perhaps ultimately the Montana Legislature, how you feel about your fishing experience.

In 1987, responsibility for regulating outfitters in Montana moved from the Department of Fish, Wildlife & Parks to the Department of Commerce. The legislature established a Board of Outfitters, a subdivision of the Professional Licensing and Regulation Division of the Department of Commerce.

In 1989, the Legislature expressed concern about whether fishing outfitters were adequately regulated. Fishing outfitters themselves have become increasingly concerned about the public's perception of their business and numbers. The Board of Outfitters has formed a committee, composed of members of various concerned groups, to investigate and report to the 1991 Legislature about issues arising from the increased competition for fishing on the most popular of Montana's streams. The committee is chaired by a member of the Board of Outfitters, and representatives from float fishing outfitters, Trout Unlimited, the Fisheries Division of FW&P, and recreational fishermen are included.

The committee encountered a lack of statistically sound data in its attempt to determine the extent of conflict on the stream, the amount of use by outfitters and others, and what, if any, regulation is necessary. Everyone has a hunch that if a fisherman at an access site were asked, "Are there too many outfitters?" the response would be a firm "Yes!"

Yet if asked how he could identify guided floaters from non-guided floaters, or how he knew for fact that outfitters had adversely affected the fishing, the response would be more equivocal. Committee members unanimously requested the Board of Outfitters fund a survey designed to accurately quantify the problems of outfitter use, conflict, and regulation. The result is the survey contract with Dr. Shannon D. Taylor and Dr. Michael D. Reilly of MSU.

The survey will be conducted in five or six general areas:

- Big Hole, Beaverhead, Madison;
- Bitterroot, Clark Fork, Rock Creek;
- Bighorn River;
- Smith River;
- Missouri River from Holter Dam to Cascade; and
- Yellowstone River from the park to the Sheep Mountain area.

The survey will be designed to identify (1) whether there are in fact too many outfitters using the major streams (and the related problem of how to define "too many"); (2) the extent to which unpleasant confrontations or incidents between guided and recreational fishermen or other outfitters have occurred; (3) methods of preventing such conflicts in the future; (4) numbers and types of stream users, including fishing outfitters; (5) the extent of voluntary catch-and-release fishing; and (6) suggestions to improve the fishing experience for everyone, including some fundamental precepts of fishing etiquette.

At the close of the 1989 Legislature, the Board of Outfitters, float fishing outfitters, and conservation groups agreed to gather information and report to the 1991 Legislature. With the help of the public, this summer's survey should represent a considerable step toward the goal of separating fact from fiction and ensuring an enjoyable fishing experience for the general public and consumers of outfitter services.

Montana's streams are a popular and economically important natural resource. If government regulation is needed to fairly apportion the demand for fishing opportunity, the Board of Outfitters believes the information gathered from the survey will form a solid foundation for a fair and reasoned discussion about the status of Montana's streams. The survey will form the basis for development of a plan to best resolve guided and non-guided use of Montana's rivers.

So, if you are approached this summer by a person bearing a clipboard, please set down your rod for a moment and support this cooperative effort to preserve Montana's fishing future.—*Mark L. Stermitz; public member, Board of Outfitters; attorney in private practice, Kalispell*

Two New Administrators

Arnold Olsen has been named administrator of the department's Parks Division and Jerry Wells will head the Field Services Division.

Olsen replaces Don Hyyppa who has moved to Director K.L. Cool's office as special assistant for outdoor recreation. Olsen was administrator of the department's Wildlife Division from July 1984 through May 1989; he then headed the Field Services Division. Cool said of Olsen's transfer to Parks, "Arnie has proven management and organizational skills and a fine record as an effective and respected professional of natural resource management."

Arnie Olsen

Jerry Wells

Wells, a 14-year veteran of the department, began his career as a fisheries biologist in Dillon. He served as fisheries manager for the department's Region 3 (Bozeman) headquarters from 1981 through 1988. He was then promoted to supervisor for Region 2 (Missoula). He replaces Olsen in the Field Services administrator's slot.

Habitat Projects Given a Helping Hand

Many species of wildlife and those who enjoy watching them will be the beneficiaries of seven habitat improvement projects recently approved for federal Sikes Act funding.

The state's Sikes Act Advisory Committee—made up of representatives from the Department of Fish, Wildlife & Parks, U.S. Forest Service, Bureau

of Land Management, and several sportsmen and conservation groups—approved the seven projects from among 15 proposals.

The Sikes Act provides a means to cost-share project development expenses between federal funds and those fees paid by hunters and fishermen who use federal lands for their activities. The projects approved must take place on federal lands.

During 1990 and 1991, $68,500 in FW&P funding was allocated for use on projects on USFS lands in Montana. This amount has been matched by $60,000 in USFS funds. Another $4,000 in FW&P funds will be matched by $4,500 in BLM funds for projects on lands administered by that agency.

Since the program's inception on a trial basis in Montana in 1987, $85,500 in federal funds has been allocated to BLM and USFS habitat improvement projects in Montana. Some of the projects recently approved were:

• An aspen regeneration project on Beaverhead National Forest land adjacent to the state's Wall Creek Wildlife Management Area south of Bozeman. The aspen regeneration will provide increased forage and cover for elk that winter there, as well as benefits for mule deer, moose, black bears, and other wildlife.

• Creation of an artificial spawning channel at Wade Lake near West Yellowstone to provide spawning habitat for several hundred rainbow trout now in the lake. This project will eliminate the need for hatchery planting, which limits the quality of the fishery, and will result in a stable, self-sustaining trout fishery for decades to come. Elk, moose, deer, and other species will benefit from improved streamside vegetation.

• Expansion of Gypsy Lake southwest of White Sulphur Springs through relocation of the existing dam. Gypsy Lake will increase from a 12 surface-acre, nine-foot-deep reservoir to a 26 surface-acre, 22-foot-deep reservoir. The new dam will be an earthen structure 34 feet high. The increased size and depth of the reservoir will expand habitat for rainbow and cutthroat trout, thus improving angler opportunities as well as habitat for elk, deer, moose, and waterfowl. Other recreational improvements include a lakeside trail and two fishing piers, which will provide access for the disabled, older visitors, and families with small children.

• Implementation of a two-pasture rotation and four-pasture deferred rotation grazing system on the Lyon Creek Resource Management Area of the Custer National Forest near Broadus. The project will improve cover for sharp-tailed grouse. The two-pasture system, in which half of the winter range will be rested from cattle grazing in alternate years, will benefit mule deer range.

• Seeding and fencing BLM's Custer Creek Reservoir project east of Miles City. The reservoir project was completed in 1989. The primary purpose of this project is to increase waterfowl production. Approximately 2.5 miles of four-strand fence with a 16-inch gap at the bottom will be installed to ensure protection of waterfowl nesting habitat. Benefits are anticipated for other game and nongame species as well.

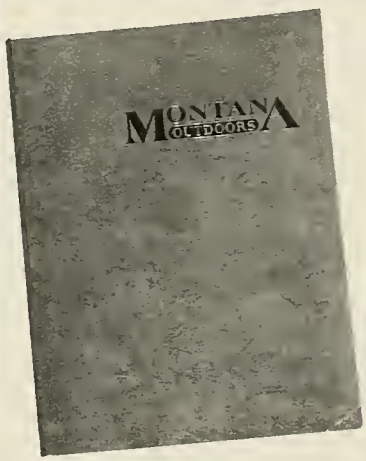
Steve Knapp, habitat bureau chief for FW&P's Wildlife Division in Helena and the agency's representative to the Sikes Act Advisory Committee, said of the habitat improvements approved for funding: "We're coordinating our efforts on the committee to ensure that the benefits of these projects will be realized by the greatest numbers of species and resource users."—*William Phippen, information officer, Conservation Education Division, Helena*

Department Film Wins Award

"The Full Circle," a Department of Fish, Wildlife & Parks film that chronicles the progression of wildlife management in Montana, has received a Golden Eagle award from the Council on International Nontheatrical Events (CINE) in Washington, D.C.

By receiving the CINE Golden Eagle, "The Full Circle" has earned the right to represent the United States in the Wildlife and Ecology competition at the prestigious EKO Film Festival in Ostava, Czechoslovakia, and at other international film festivals.

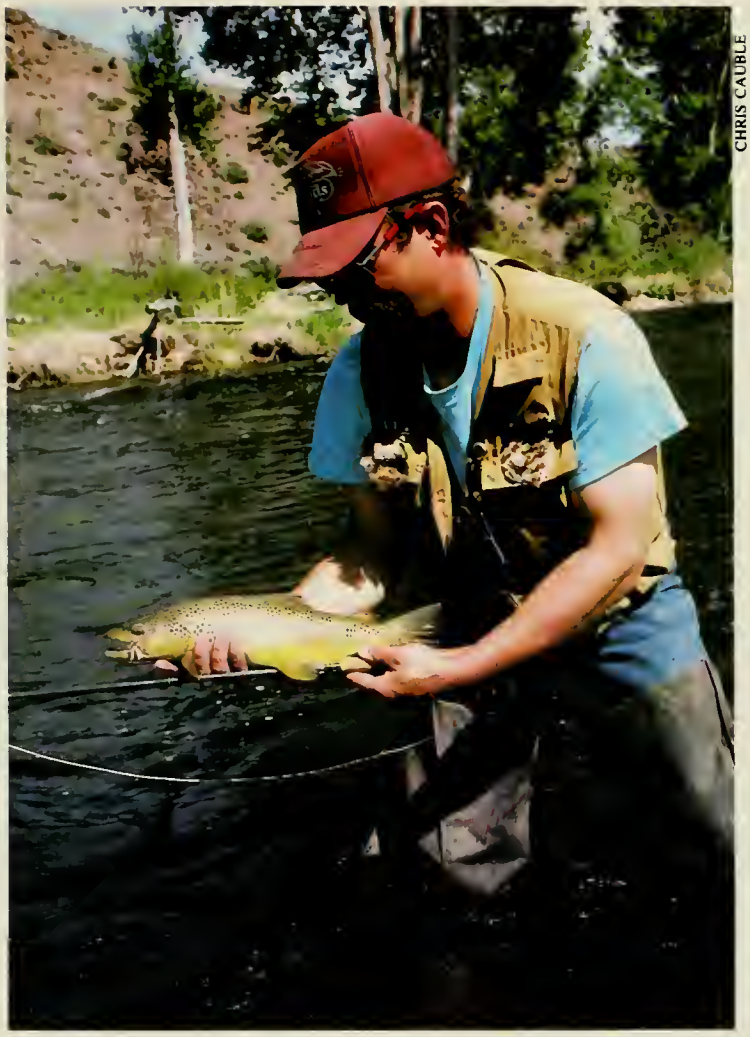
Directed by FW&P cinematographer Mike Gurnett, the film is available free for screenings at meetings, classes, or conventions. Copies of the 27-minute film are also for sale, either on 16mm film ($300) or VHS tape ($29.95). For more information, contact the FW&P Film Center, 930 Custer Avenue West; Helena, MT 59620 (406/444-2426).



Clutter Got You Behind the Old Eight Ball???

Stack 'em up in a MONTANA OUTDOORS binder—and start all over with a clean slate.

One binder holds six issues. To order yours, send $6 (includes postage) to: MONTANA OUTDOORS, Department of Fish, Wildlife and Parks, 930 Custer Avenue West; Helena, MT 59620.



CHRIS CAUBLE

RIVER RESTORATION PROGRAM:

R_x For Recovery

by Tom Palmer

IT'S A WILDLIFE MANAGEMENT MAXIM that quality habitat is the key to wildlife abundance. In other words, you can drop deer onto a Montana mountain but without suitable hiding places, proper things to eat, and clean water, their odds for survival are about the same as a chimpanzee's.

Suitable hiding places, proper things to eat, and clean water also are among the habitat needs of fish. Yet when most of us think fish, we think water—and perhaps the occasional bug—can sustain them. And somewhere along the line we came to believe that any shortfall in angler catch rates can be easily augmented with a truckload of new hatchery recruits.

Before 1974, that's pretty much the way it was in Montana. Tons of trout were dumped into rivers and streams, and anglers took them out with hooks, lines, and sinkers. In 1974, however, Montana stopped stocking rainbow trout in almost all streams. By 1976, the state had quit stocking virtually all streams with trout and had begun to let nature take its course.

The secret is: Trout can fend for themselves and naturally replenish their numbers in streams that provide them with everything they need to live, grow, and reproduce. Surprise, surprise, surprise—the key to fish abundance is quality habitat.

For the past 15 years, the state's wild trout fisheries have been a source of pride for Montanans. Yet some of Montana's best trout streams have suffered the consequences of an array of activities that include railroad and road construction, urban and industrial development, and agricultural enterprise. As a result, fish habitat has been degraded in portions of rivers like the Big Hole, Bighorn, Blackfoot, Clark Fork, Jefferson, Missouri, Yellowstone, and in numerous smaller streams across Montana.

The problem of degraded fish habitat is ancillary to a particular land use that removed shrubs, trees, grass, or other vegetation from the riparian (streamside) environment. Land use that impacts the quality of fish habitat could be as obvious as river channelization or as seemingly subtle as grazing cattle.

In years past, the way to "fix" the stream for anglers was to plant hatchery fish. Today, however, fisheries managers know that the future of Montana's multimillion-dollar sport fishing resource depends on preserving and restoring fish habitat, a fact that wasn't lost on Montana's 1989 Legislature.

In 1989, Montana legislators approved a Department of Fish, Wildlife & Parks program that will ensure the availability of about $110,000 per year for restoration projects for rivers and fisheries. The money to fund the River Restoration Program will come from a 50-cent resident fishing license fee increase and a $1 increase for full-season nonresident fishing licenses.

River and stream restoration is rapidly emerging as the eco-cure of the 1990s. Nationally, the U.S. Forest Service, responsible for managing about 128,000 miles of cold-water streams in our national forests, will spend $24 million on fish habitat restoration this year alone. In Montana, FW&P's River Restoration Program will provide funds for restoration and enhancement to individuals, landowners, private groups, conservation districts, and local, state, and federal agencies.

THE BEST TROUT STREAMS CARVE THEIR WAY through a landscape—running, plunging, and twisting down mountains and meandering lazily through valleys—to create a network of gravel-bottomed riffles, deep pools, and undercut, almost cantilevered, stream banks, along the way.

Each feature (or "habitat attribute" in fishery science parlance) the stream creates plays an important role in the life

"In a lot of areas, by just allowing vegetation to reclaim a site, we're also protecting and restoring a natural system that actually can do more to create wild fish habitat."

DAVE BOOKS

of trout. Riffles provide spawning areas and harbor the water-borne insects and small fish that trout use for food. Pools and undercut banks offer resting and hiding places for larger trout. Streamside brush—grasses, shrubs, and trees—also provides essential shade and cover while the weave of the root systems diminishes stream bank erosion that would eventually force the undercuts to collapse, fill pools, and choke riffles with sediment.

If one or more habitat attribute is somehow eliminated, a prized trout stream, or at least a portion of it, would likely lose its blue ribbon because a link in the ecosystem's chain that trout require to live, grow, or reproduce has been broken.

Some projects that could be funded through FW&P's River Restoration Program to repair broken or missing links include: riparian enhancement, improvements to provide passage for fish migration, stream channel rehabilitation, bank stabilization, irrigation diversion modifications, and river corridor cleanup programs.

"Habitat destruction is real and it's out there and it's affecting our streams," said Al Wipperman, chief of FW&P's Fish Habitat Protection Bureau. "What we'd like to do is enhance or restore stream habitat and these new funds will help us do that." Criteria for evaluating projects will include:

- benefits to public fisheries;
- benefits to public use and productivity of other river resources;
- cost-sharing or in-kind services;
- severity of the problem;
- importance of the river or stream as fisheries habitat;
- local support for the project;
- potential for statewide application; and
- access for public fishing on or near the project area.

Much of the work that needs to be done is in and along riparian areas. "That's where I hope a lot of the money is going to be spent," Wipperman said. "At first I think people will want to look at structural projects—things like dams and deflectors and other engineered designs. But in a lot of areas, by just allowing vegetation to reclaim a site, we'll see that by protecting the riparian environment, we're also protecting and restoring a natural system that actually can do more to create wild fish habitat."

In the past 200 years, more than half of the 215 million acres of riparian areas that once existed in the United States have been destroyed. We continue to lose between 300,000 and 450,000 additional acres each year. It's a telling statistic because as riparian areas go, so goes fish habitat. If you've ever wondered where all of America's wild trout have gone, stop looking at the stream and start looking at the stream banks and beyond.

For Wipperman, the River Restoration Program is a step toward bettering Montana's river resources by improving how Montanans use their lands. "I hope a lot of the restoration efforts are spent in the riparian areas," he said. "To help a stream recover on its own, we can assist with grazing management systems, plant some willows, and generally improve other land uses—and nature will really take care of the rest."

Trout Unlimited in Montana

Al Wipperman, chief of FW&P's Fish Habitat Protection Bureau, doesn't have to ferret out projects to fund with Montana's new River Restoration dollars. "We have 13 Trout Unlimited chapters in Montana, and most of them have been involved in this river and stream restoration business for quite a while," he said.

Trout Unlimited (TU), a 65,000-member national organization dedicated to trout and salmon conservation, is becoming increasingly interested in stream improvement and riparian habitat protection and enhancement projects.

"TU has pretty much been the leader in recognizing that trout habitat is the key to successful wild trout management," Wipperman said. "The group has been quite active in Montana." Here's a brief run-down of some recent river restoration projects taken up by some of Montana's TU chapters:

BIG BLACKFOOT RIVER CHAPTER

The chapter, formed to champion a Blackfoot River fishery that began to show the ill effects of mining-related contamination, heavy sediment loads related to logging operations, and low stream flows, has a wide membership in western and central Montana.

When the chapter was formed in 1987, it almost immediately raised $15,000 to help fund still ongoing studies of the river. It later was instrumental in pushing for the $400,000 Upper Blackfoot Reclamation Project. The Big Blackfoot River Chapter is involved in funding studies for improving up to four spring creeks that could enhance the recruitment of young trout into the main river. The group also plans to help coordinate restoration of two marsh systems in the Blackfoot River headwaters.

GEORGE GRANT CHAPTER

Over the past several years, the Butte-based George Grant Chapter has sponsored and participated in a wide array of projects including the Big Hole River access sites at Melrose, Jerry Creek, Dewey, Divide, and Bryant Creek. The chapter has built livestock bridges and stream protection fences on spawning springs on the Jefferson River and has funded grayling studies on the upper Big Hole River.

The group is involved in the $100,000 rehabilitation of Little Blacktail Creek, a headwater tributary to the Clark Fork River. The project started this spring, and about 1.5 miles of stream will be cleaned, structures will be placed in the stream to enhance the habitat for brook trout, and the stream will be stabilized to prevent erosion. Ultimately, the process will continue downstream to the confluence with Silver Bow Creek. Contributors include: K-Mart, Butte/Silver Bow government, Mile High Soil Conservation Service, FW&P, Boy Scouts, and streamside landowners.

In addition to the Little Blacktail Creek Project, the chapter will help fund the $50.000 Melrose Channel Stabilization Project on the Big Hole River. The project will protect the east channel from drying up and protect the bridge on the west channel during floods. The project also will provide sufficient water flows down the east channel to allow continued use of the Salmonfly Access at Melrose and preserve about five miles of prime trout habitat. Additional contributors include: TU, FW&P, Mile High Soil Conservation Service, Beaverhead County, Butte/Silver Bow government, Stauffer Chemical Co., and local landowners.

PAT BARNES MISSOURI RIVER CHAPTER

In 1990, this Helena-based TU chapter will be involved in a stream clearance project to remove obstacles for spawning trout from Beaver Creek, a tributary to the Missouri River and Confederate Gulch, which feeds Canyon Ferry Reservoir. The chapter also sponsors an annual spring cleanup of Missouri River stream banks.

MISSOURI RIVER FLYFISHERS

Great Falls' Missouri River Flyfishers also sponsors its own Missouri River cleanup and recently completed a willow-planting project in the Belt Creek riparian area. Last spring, members completed a bank stabilization project on Little Belt Creek.

The club is discussing commissioning aerial photos of portions of the Missouri River below Holter Reservoir, where residential development could impact trout habitat.

RAY TILMAN

Annual spring cleanups are just one of many stream improvement projects sponsored by Trout Unlimited chapters in Montana.

MAGIC CITY FLY FISHERS

With the help of several TU members from Colorado, this Billings-based chapter helped to organize an extensive replanting of 600 willows on private land on a three-mile stretch of the Bighorn River's south bank.

TU's Madison-Gallatin, Bitterroot, Northwest, Joe Brooks, and West Slope chapters, to name only a few, have also participated in several noteworthy river and stream restoration projects.

Although TU is becoming more active in river restoration in Montana, it is not the only organization that can apply for FW&P's River Restoration Project funds. Funds will be available to private landowners, conservation districts, sportsmen clubs, and others presenting deserving restoration projects.

For information on how to apply for project funds, write to Al Wipperman, Fish Habitat Protection Bureau, Department of Fish, Wildlife & Parks, 1420 East Sixth Avenue; Helena, MT 59620.■

Montana may be best known as a trout fishing mecca, but opportunities also abound for warm-water species like walleye, bass, and panfish.

PAUL UPDIKE

A World of Fishing Beyond Trout

by Phil Stewart

A FEW YEARS AGO, while waiting in line at the grocery store in Miles City, I overheard a conversation between two anglers. One of them was a Miles City resident and the other was from the western part of the state. The western Montanan commented that it was too bad there was no fishing in the area. That comment brought a quick response from the Miles Citian about the kinds and sizes of fish that could be caught from the lower Yellowstone River and area reservoirs. The western Montanan equated fishing with trout fishing, but the Miles City angler knew there was a world of fishing beyond trout.

The western Montanan's attitude toward fishing was probably quite common a few years ago, but the 1980s brought new interest in fishing for species other than trout. This interest has spread from eastern Montana to west of the Continental Divide, where a few warm-water fishing clubs are now active.

WHAT IS A WARM-WATER FISH?

"Warm-water fish" is a general name for most freshwater fish species other than trout, salmon, and whitefish. The name is somewhat misleading because many warm-water fish tolerate winter water temperatures of 32°F for extended periods.

Temperature does have an important effect on fish activity, feeding rates, and growth. Optimum temperatures—conditions at which these functions are most efficient—are the 70°F to 80°F range for most warm-water species and 50°F to 65°F for cold-water fish species. Some fish species fit in a range between these extremes.

Many of the popular warm-water fish in Montana are not native, but have been introduced. Only six popular warm-water species are native to Montana: paddlefish, shovelnose sturgeon, northern pike, channel catfish, burbot (ling), and sauger. We'll talk about the first five natives below, and about the sauger in the discussion of the perch family.

Paddlefish

This unique fish is one of the most

interesting in Montana. It is a year-round resident in Fort Peck Reservoir and in the dredge cuts below Fort Peck Dam. Spring spawning runs from Fort Peck enter the Missouri River. Spawning runs from North Dakota move into Montana; part of the run moves up the Missouri River to Fort Peck Dam, while the rest enters the Yellowstone River.

Adult paddlefish commonly weigh from 25 to 100 pounds. In reservoirs, they feed by straining nearly microscopic-sized plants and animals (called plankton) from the water.

Paddlefish are taken by fishermen using snag hooks. Popular fishing spots are at Intake near Glendive and the Slippery Ann area just upstream from Fort Peck Reservoir.

Shovelnose, pallid, and white sturgeon

The shovelnose is the smallest and most abundant of the three sturgeon species inhabiting Montana. The shovelnose is found in the lower Yellowstone and Missouri rivers and their larger tributaries. Preferred habitat is at or near the bottom of large rivers over firm, sandy bottoms and in strong currents.

The shovelnose typically weighs from two to eight pounds at maturity; larger specimens have been reported, but sturgeon weighing more than 16 pounds are more likely to be the very rare pallid sturgeon.

Shovelnose sturgeon feed on aquatic insects, some small fish, and other aquatic organisms found on the stream bottom. Fishermen frequently catch shovelnose in moderately fast water using worms.

Although few fishermen seek this small sturgeon, its flesh is palatable especially when smoked.

The pallid sturgeon inhabits the same general habitats in the Missouri and Yellowstone rivers as the shovelnose. The two are similar in appearance, but the pallid grows as long as 50 to 60 inches and weighs up to 60 pounds.

Because it is so rare, little is known of its habits, feeding activity, or specific habitat requirements. The U.S. Fish and Wildlife Service has recommended it as an endangered species.

It is seldom taken by fishermen, although the younger, smaller specimens are so similar to the shovelnose that they may not be recognized. Montana and North Dakota wildlife agencies are making special efforts to alert fishermen to the status of the pallid sturgeon, to provide identification tips, and to encourage fishermen to report pallid sturgeon catches. Montana's fishing regulations require release of all pallid sturgeons.

The white sturgeon occurs in Montana only in the Kootenai River. It is also a rare species, seldom taken by fishermen. Its habitat in the Columbia River Basin has been greatly restricted by dams. It is unlawful to possess a white sturgeon.

DAVE BOOKS

Adult paddlefish range in weight from 25 to more than 100 pounds. During the spring spawning run, fishermen gather at Intake near Glendive (above) and the Slippery Ann area just upstream from Fort Peck Reservoir.

Northern pike

Northern pike are among the most voracious of freshwater fish predators. Their streamlined bodies, large mouths, and numerous large teeth are perfectly designed for capturing and consuming almost any living organism small enough to fit into their mouths.

Northerns are found in low-elevation rivers, streams, lakes, and reservoirs throughout Montana. Distribution of this species west of the Continental Divide in Montana resulted from an unauthorized introduction. In many of these locations, lack of adequate food results in emaciated fish 14 to 15 inches long and often called "hammer handles."

In suitable waters with adequate food and habitat, northern pike constitute a valuable fishery. They are a favorite of many fishermen because of their fighting ability and the high quality of their flesh. Fish of two to eight pounds are common in good habitat, and they are taken on lures or minnows.

Catfish family

Black bullheads are found in waters across much of the state, especially in small ponds. They are easily caught on bait and many a youngster has first experienced the joy of fishing in a "bullhead pond." Most weigh less than one pound. The yellow bullhead is a similar species, but it is far less common in Montana.

The channel catfish is a common to abundant species in the lower Yellowstone and Missouri rivers and in reservoirs in the eastern one-third of the state. A favorite dinner item for many, the "channel cat" is growing in popularity because of its commercial production in the southeastern United States.

Channel catfish eat a variety of food, including other fish. They are most often caught on worms and stink baits (poultry entrails, partially rotted meat, etc.). Some grow very large, but most are between one-half and 10 pounds.

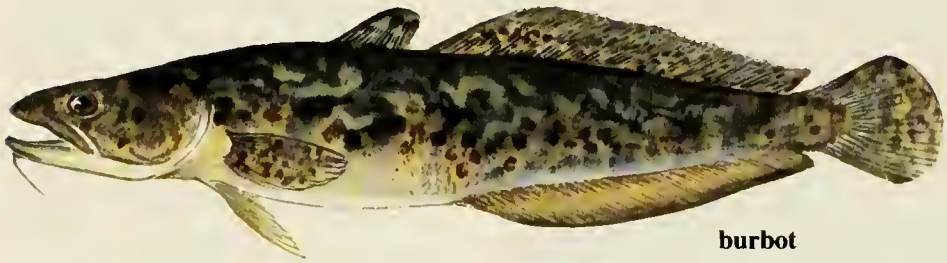
Burbot (ling)

The burbot is an unusual fish seldom seen by anglers. It is the only freshwater representative of the codfish family. Although it is relatively common in

larger rivers and many reservoirs, it generally inhabits the bottom of deep waters in rivers and reservoirs. A voracious predator, it feeds at night, largely on other fish and some larger invertebrates.

It is one of the few fish species to spawn in mid-winter. Burbot move to shallower areas to spawn where they are taken by ice fishermen in January and February. Young burbot are also found in shallower waters during early spring.

One- to five-pound burbot are common, but larger examples are occasionally taken. Some consider the flesh excellent, but the burbot is generally not a prized food fish.



burbot

Sunfish family

The sunfish family comprises sunfish, basses, and crappie. None are native to Montana, but they have been widely planted and are common over most of the state, with the exception of the southwest.

Montana's three types of sunfish—the bluegill, green sunfish, and pumpkinseed—are common in ponds and reservoirs in the eastern third and northwestern parts of the state. They are caught on worms, wet flies, and small lures. Only the bluegill commonly reaches sufficient size to interest anglers.

Largemouth bass are one of the most popular warm-water fishes. They are most abundant in lowland reservoirs and ponds, and ponds with shallow weedy areas provide typical habitat. They are especially common in the eastern third of the state and in northwestern Montana's ponds and lakes. Largemouth bass are taken on a variety of live baits and lures, and they commonly weigh between one-half to two pounds.

Smallmouth bass have been introduced in fewer spots than the largemouth. Since the smallmouth grows at lower water temperatures, it may turn out to be a more suitable fish for many parts of Montana than the largemouth. The smallmouth is very much a river fish, although it also prospers in lakes and reservoirs. Smallmouths have a reputation as exceptionally hard fighters on hook and line. Montana has only a few good fishing spots for this species, including Fort Peck Reservoir, Tongue River and Reservoir, and a few lakes in northwestern Montana. Smallmouth caught by anglers commonly weigh from one-half to two pounds.

The black crappie and white crappie are similar; both are common in Montana east of the Continental Divide. They are often abundant in medium to large reservoirs, but usually not in rivers. They are very catchable in late spring when spawners concentrate near shore. Typical sizes are six to 12 inches long; a 12-incher weighs about one pound.

Perch family

Yellow perch are common in lakes, ponds, and reservoirs over much of the state. Although most perch weigh less than a pound, their flesh is of excellent quality and they provide year-round fishing. They are caught on a variety of baits and lures. Typical perch are six to 10 inches long.

Even though there are better fighters on hook and line, many warm-water anglers prefer catching walleye over all other species. The quality of the flesh is excellent. Walleyes have been heavily planted, especially recently. Although they are found in the lower Yellowstone and Missouri Rivers and tributaries, walleye are most abundant in medium to large reservoirs in eastern and central Montana. They usually weigh between one and four pounds.

The sauger is a river-dwelling cousin of the walleye, and it is abundant in the lower Yellowstone and Missouri Rivers. Sauger are similar to walleye but are more slender and weigh less at a given length. Typical sizes are one-half to three pounds.

WARM-WATER FISH MANAGEMENT: DEPARTMENT GOALS

A 1987 publication, "Montana Warm-Water Fish Management Plan," outlines the Department of Fish, Wildlife & Parks' direction and goals. This 62-page document is available from department offices. The department intends to increase public opportunity to fish for warm-water species by:
(1) increasing the number of waters producing warm-water fish,
(2) enhancing the production of waters presently producing warm-water fish, and
(3) preserving or enhancing the habitat in waters supporting warm-water fish.

The newly remodeled and expanded warm-water fish hatchery at Miles City is an important tool for reaching these goals. This hatchery was obtained from the federal government in 1983, but it required extensive upgrading. The work

sauger

yellow perch

was completed in 1988, at a cost of approximately $5 million. The hatchery produces walleye, northern pike, largemouth and smallmouth bass, crappie, and channel catfish.

This hatchery enables the department to plant fish into new waters in large numbers and to periodically replant waters where natural reproduction is insufficient to maintain healthy populations.

Meeting hatchery production goals will be a challenge. Warm-water fish culture is not as advanced as trout culture. Each year, eggs for northern pike and walleye must come from wild sources, since adults of these species can't survive in a hatchery setting. Largemouth and smallmouth bass adult brood fish are difficult to maintain in hatchery confinement because of disease, parasites, and lack of a high-quality artificial food.

PROBLEMS AND STRATEGIES

Rivers and streams

Warm-water fish inhabiting rivers are sensitive to flow rates and water levels—warm-water fish populations in some rivers barely survive because of periodic dewatering. Considerable effort has been expended in determining optimum flow rates for warm-water fish in Montana rivers. The department applied for and received an instream flow reservation for the Yellowstone River and its tributaries to maintain fish populations. The department is preparing applications for other rivers with warm-water fish.

The department cooperates with federal and state agencies to improve water release schedules from dams for warm-water fish.

Lack of public access to streams and rivers continues to be addressed through the Fishing Access Site Program. The department purchases or leases sites on streams and rivers and provides boat launching facilities on larger rivers.

Some Montana rivers, especially in transitional reaches between cold and warm-water portions, have few fish species of interest to anglers. In some of these spots, the department has introduced new species of game fish. For example, in the mid-1980s, department fisheries workers planted smallmouth bass in the lower Bighorn River, downstream from a reach popular with trout fishermen.

Unlike some states, Montana has two laws that protect rivers and streams: the Stream Protection Act and the Natural Streambed and Land Preservation Act. Department personnel review hundreds of projects each year. While the majority of these are planned on trout streams, some are scheduled for warm-water rivers. Projects proposing to channelize, shorten, or otherwise damage a stream's ability to produce warm-water fish are modified to eliminate or at least minimize damage.

Fishing regulations for warm-water fish in rivers have mostly been quite liberal. There is no limit for some species in eastern Montana because of relatively low utilization by anglers. In some eastern Montana rivers, noncommercial use of hoop nets is legal for taking unlimited numbers of nongame fish, catfish, burbot, and shovelnose sturgeon. This technique is especially effective for channel catfish.

Lakes and reservoirs

River systems often produce excellent native fish populations without drastic management measures as long as the river channel remains intact and there is no gross water pollution or dewatering. Warm-water fish in lakes and reservoirs are often introduced species requiring periodic biological "tinkering" if the system is to continue producing fish of the desired kinds and sizes.

To manage and improve fisheries in lakes and reservoirs requires understanding the abundance, growth rate, and general status of the fish species present. Also important is some information on angler harvest and catch rates. Much department effort goes into these activities on warm-water lakes and streams.

In waters with populations of predators (such as walleye and northern pike), the availability of food (such as minnows and panfish) may limit the growth and abundance of the desired predators. This has led to widespread introductions of food species. An example is planting spottail shiner and cisco in Fort Peck Reservoir. These species have contributed to an improved walleye population.

In waters with few species desired by anglers, predator fish species have also been introduced to add a species of interest to anglers that will utilize undesired fish for food. Some of these species, especially walleye and northern pike, are unable to reproduce in Montana reservoirs because of a lack of suitable gravel bottoms (walleye) or a lack of rising water levels in the spring to flood vegetation (northern pike). So fish must be planted annually to maintain these populations at densities high enough to provide good fishing.

The reverse is a common problem for other species. Both bluegills and yellow perch are notorious for overpopulation and stunting—many fish, but few large enough to interest anglers. Planting predator fish such as northern pike or walleye has been used as a cure, but not always with success. Treatment with chemicals, to decrease numbers and increase growth rate, can be successful. Because of cost, this is feasible only on smaller reservoirs.

On multipurpose reservoirs, managing the water level is crucial. Many prey and predator species may not spawn

successfully if water levels are low or falling at spawning time. Negotiations with the agencies managing the water may bring about some improvement, but other water uses often prevent managing water levels to favor fish. The Miles City hatchery could play a role by replacing natural reproduction with hatchery fish.

In shallow lakes and reservoirs, fish die during the winter because of low amounts of oxygen under the ice. On small bodies of water, winterkill can completely eliminate a fish population. These waters can be replanted, but planted fish don't reach catchable size for two to four years. In eastern Montana, many such ponds are planted with rainbow trout, despite summer water temperatures that cause a long period of stress and occasional heavy mortality. Because growth is rapid, the period that the pond is out of production is less than a year and often only six months. Fingerling (three inches long) rainbow trout planted in spring can easily grow to 10 inches long by late fall.

One of the most troubling problems in warm-water lake and reservoir management is the unauthorized, illegal introduction of fish (see "Illegal Aliens" on page 35 of this issue). Black bullheads, green sunfish, yellow perch, northern pike, and other species have been illegally planted in many bodies of water. They become abundant, stunt, and outcompete other species for which the water was being managed. Smaller ponds and lakes can be chemically treated to remove all fish, but the cost is high, and the water is out of production until replanted fish reach catchable size. For larger lakes and reservoirs, chemical treatment is not possible and the illegal introduction generally results in irreversible addition of an undesirable fish species and long-lasting effects on other species.

Fishing regulations are used to fairly distribute fish among anglers, maintain or increase densities of larger fish, or simply prevent overharvest. Largemouth bass are particularly vulnerable to overharvest. A few waters have a limit of five largemouths, only one over 12 inches. Some waters also have a catch and release only regulation during the spawning period to prevent overharvest of larger bass. Crappie, yellow perch, and bluegill have no daily limit because these species tend toward overabundance.

Access to larger warm-water lakes and reservoirs is generally good because accesses are mostly under state or federal ownership. The department has provided boat ramps and related facilities at state recreation areas on larger bodies of water. Largely in eastern Montana, cooperative arrangements have been made with landowners for public access to small ponds and reservoirs. The department has planted fish, provided fisheries management and, on occasion, small amounts of money for dam repair and maintenance, in exchange for public access.

All seven Fish, Wildlife & Parks regions provide opportunities to catch warm-water fish. Local information is available in department regional offices. Glasgow and Miles City offices provide lists, with maps, of small reservoirs with warm-water fish. ■

JAMES CONNOR

Largemouth bass are strong fighters best known for their aerial acrobatics after being hooked. They are most abundant in lowland ponds and reservoirs in the eastern third and northwestern corner of the state.

Wilderness Recollections

The following expresses my attitude toward "primitive" or "wilderness" areas.

The photo is a copy of a picture developed and printed in my mother's kitchen in 1934. The wooden Kodak folding horizontal home enlarger with which it was printed is still in my possession and in excellent condition. The picture provides quite a comparison of the "good old days" with the "better new days"!

To me, recreation has been associated with the outdoors in Montana. My good fortune is to have lived here all of my life and to have had a father and mother who believed the best of the best existed in this last great treasure of open land.

Hiking, fishing, hunting, photography in Montana—truly the best of the best, and generally better today than 50 years ago.—*Paul J. "Joe" Walters, Billings*

The Best of the Best

Wilderness! Are we protecting the few remaining jewels of nature, or preventing people from enjoying them?

Backpacking into the Beartooth Primitive Area from high school days (1933) until about eight years ago, I enjoyed the almost pristine area while it was at its best.

My first equipment consisted of two World War I wool blankets sewn together, a heavy 10-by-14 tarp, and two tire liners with loops riveted on each end which were slipped over a couple of short harness straps.

To make up the pack, a folded tarp was wrapped around canned food, slab bacon, potatoes, bread, staples, and pots and pans, making a bundle about 30 inches long. Diameter depended on the length of the trip and the estimated appetite of the packer.

The two harness straps were then placed around the roll in a way which let the tire liners loop enough to serve as pack straps. They made good pack straps—they were sort of rigid, standing out from the bundle, which made the pack easy to shoulder. The edges were cupped, so they didn't cut into one's shoulders.

Blankets were rolled into a cylinder with a smaller tarp and tied into a horseshoe-shaped bundle. This was hung around the neck on top of the pack. You could fasten a tump line to the pack and fit it around your forehead.

To rest your back, you put the tump line on. Leaning forward supported part of the weight on the headband. It helped, and any relief was welcome. This arrangement, fitted out for a couple of weeks, weighed in at 80 pounds.

On steep parts of the trail, you would truly expire every hundred yards or so, revive, and continue. Going downhill wasn't much better. You had to bend your knees or the thumping shock of that weight would soon make them so sore it was hard to move.

The rewards were worth the effort. Coming up across the scree, the first view of Black Canyon Lake was truly inspiring. This marvelous jewel—with a tremendous cliff on the left, a steep, rock-tumbled slope on the right, the alpine backdrop of mountain, glacier, and stream reflecting in the quiet water—still fills my mind after 50 years.

The nighttime sound of huge ice-split granite chunks falling a thousand feet from the cliff to crash explosively on the rubble of the ages woke one with the thought of artillery fire and a shelter half shaking in blast and shock wave. How marvelous to realize where one was, to breathe the sharp, cordite-free, alpine air, and to drift off again knowing the crashing theme was the beginning conversion of sharp-edged granite to life-supporting soil, not the sound of destruction.

Other less spectacular scenes also remain: my tent, unknowingly placed across a faint game trail at Lost Lake, and my presence challenged by a young mule deer buck. He insisted for five minutes or so that the tent should be moved. I sat and drank my coffee while he complained, snorting and swinging his three-point rack.

His dinner date finally arrived. She, ladylike, solved the dilemma peaceably, leading him around the tent and back onto the trail. Both passed within 10 feet of my coffee-drinking perch on a log. Buck and doe together wandered down to the lake, presenting a classic picture as they fed along the shoreline. The coffee got cold while I watched.

In the late 40s, the equipment got much better. A fine 4-by-7 tent; a warm, comfortable down bag; inflatable mattress; food for seven to 10 days; utensils, stove, and fuel to prepare it—all fit into a package of less than 40 pounds.

With the high-tech items available now, if one can carry the groceries from the store to the car, mow the lawn, or clean the house, one can also backpack in a wilderness area.

A lesson learned early was that the goal should not be how far and how fast. Enjoy the trip...take time on the trail and in camp to look around, to truly see the land, the flora, the fauna. "Smell the flowers," seems a trite statement, but it is good advice in the wilderness. Stop and really look at that miraculous blanket of blue butterflies covering the trail and hovering above it. Slowly and quietly follow a tiny trickle up a hillside, finding flowers, birds, and sometimes the delicate configuration of a splash of orchids on a damp, mossy bank.

Be tired enough to sleep well, but not so tired you don't hear the night birds or note the incredible brilliance of stars and moon, or mark in your mind the small night noises passing by. The memory of a night alone, free from the encumbrances of the society of man, in an area remaining natural, is a goal any of us should have the opportunity to achieve.

Outdoorsmen before us made the enjoyment of wilderness available. It is our privilege and duty to protect and increase it for those after us.

To answer the original question: Wilderness preserves the irreplaceable. It is available with effort, and some physical price should be paid for entering it. I know that it is unnecessary to push on to the depths of wilderness to be in wilderness. I know that if man makes his way on the trail one-half a mile or walks 400 yards away from the minimal traces of man, he will be where new thoughts flow, tingles ride into the gut with unfamiliar sounds after nightfall, and peace and hope are visible with the sunrise. If conditions prevent me from getting there again, the knowledge that it exists will make my more limited world livable.

There is nothing on this planet worth as much as the small section of it left to be as it will be.

* * * * *

My daughter wrote the enclosed for her high school English class.—*Ron Bonnett; Morristown, Tennessee*

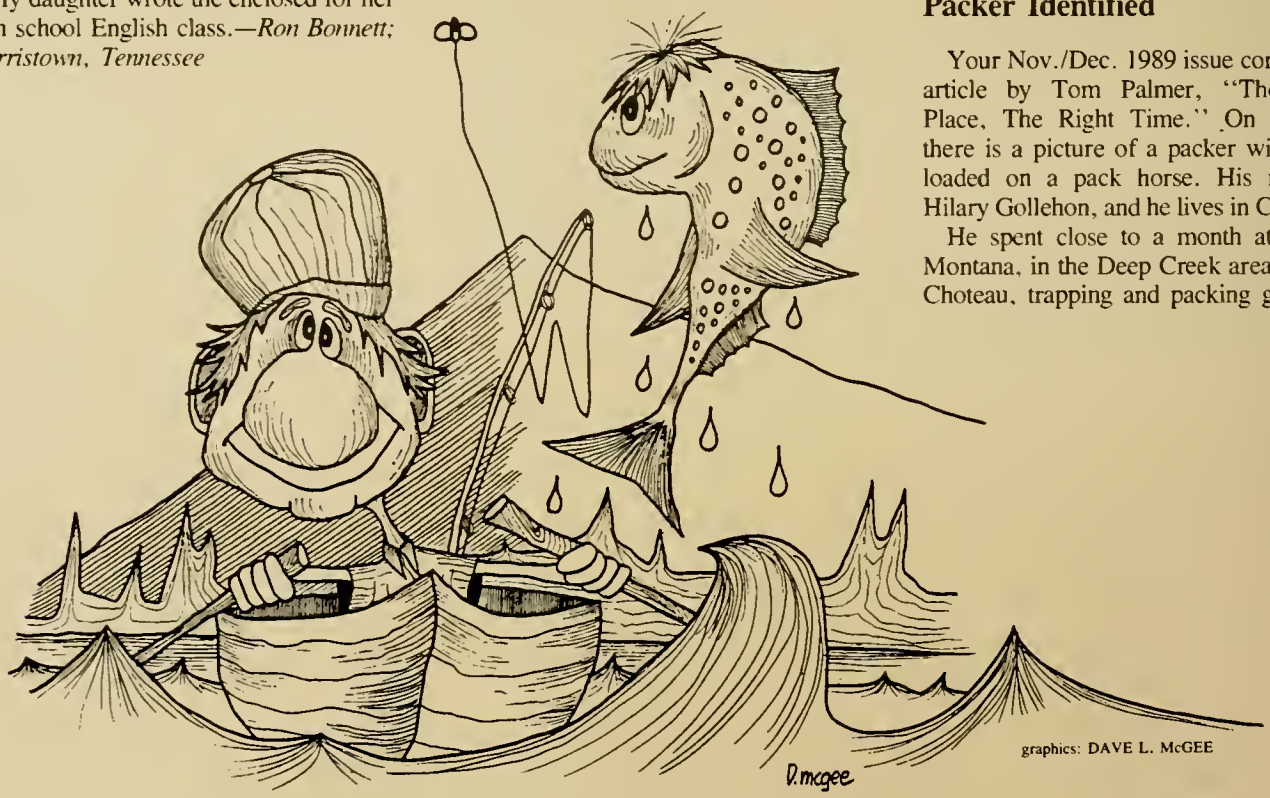
The Camping Experience

I was horrified the moment my parents told me about the eight-day canoeing and camping trip they had planned in the remote Montana wilderness. I knew instantly that I would miss hot showers and all the comforts of home. Although this was definitely not my idea of a vacation, my parents thought it was going to be paradise and that they were doing me a great favor. While the rest of the family was filled with anticipation and excitement devoting time and thought to planning for the trip, I became increasingly apprehensive as the departure date neared. I thought of last summer's trip when I read the quotation from Virgil's "Aeneid," "Someday, perhaps, remembering even this will be a pleasure."

The trip was full of surprises I had not anticipated. The only way to bathe was to immerse myself in water below sixty degrees. The second day a calamity occurred when I found that all the ice had melted and the soda had been consumed. On the last day, the only food left was dried prunes and cream of wheat. The list of irritants could go on and on.

Only six months have passed since my unique adventure with my family down the Smith River, and I have already derived pleasure and humor in remembering parts of the trip. The unparalleled beauty of the scenery left images in my mind I can still see. The beautiful canyon and surrounding mountains seemed unspoiled by man. The uninterrupted quiet gave me a feeling of inner peace. The rhythmic sound of the paddle in the water and the sound of the water flowing over the rocks were intensely soothing. The feel of the breeze on my skin was refreshing and the fragrance of wildflowers and evergreens smelled lovely. On the trip I laughed as I heard the screams of my family as they braved the cold water every evening to bathe. While the pleasant memories have become vivid, the unpleasant ones have faded.

On the eighth and final day of the trip when I pulled my canoe out of the river with a tremendous sense of relief, I resolved never to think or talk about the river trip again. As time has gone by, I have indeed found it pleasant to think about the things I once thought were unpleasant. In our stress-filled world, many people have spent time and money looking for artificial means of relaxing. The memories of my Montana experience have provided me with comfort in hard times. Pleasing thoughts have come to mind when I have looked at the pictures taken of the lovely river.—*Brandy Bonnett*

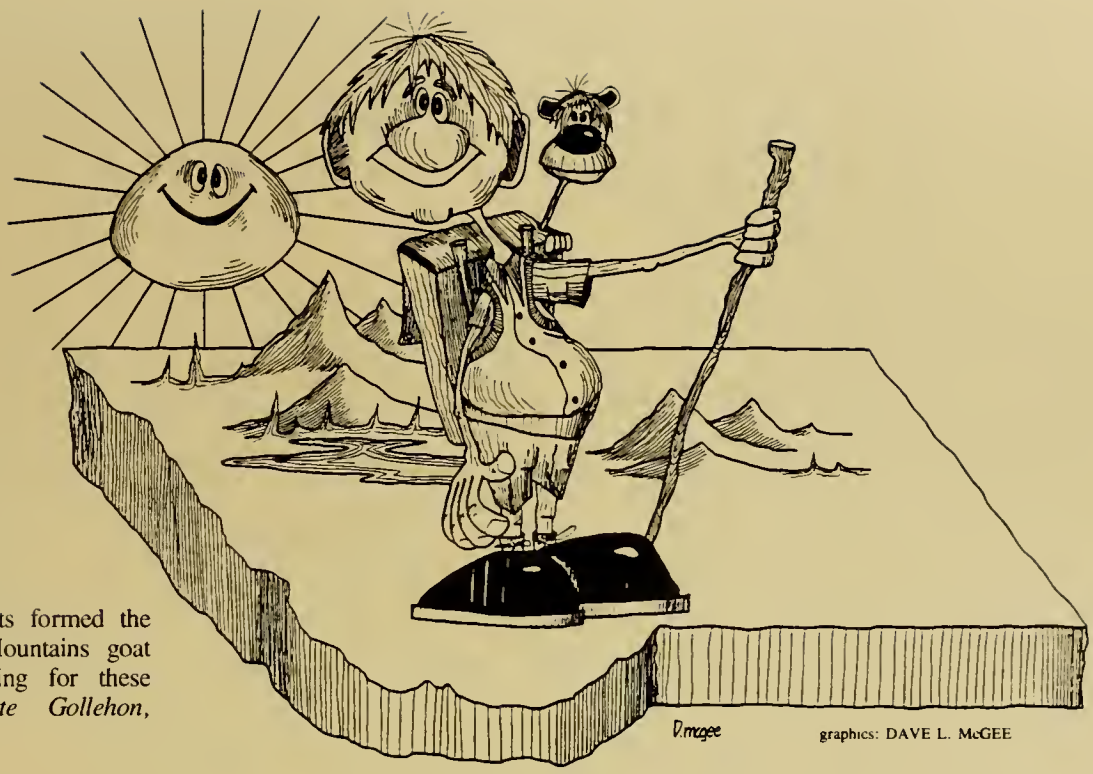


graphics: DAVE L. McGEE

Packer Identified

Your Nov./Dec. 1989 issue contains an article by Tom Palmer, "The Right Place, The Right Time." On page 8, there is a picture of a packer with goats loaded on a pack horse. His name is Hilary Gollehon, and he lives in Choteau.

He spent close to a month at Chute, Montana, in the Deep Creek area west of Choteau, trapping and packing goats off



graphics: DAVE L. McGEE

the mountain. These goats formed the nucleus of the Crazy Mountains goat herd. No helicopter lifting for these old-time packers!—*Janette Gollehon, Choteau*

Feel the Freedom

Having been a subscriber for years and having enjoyed every issue, I was particularly impressed with the Sept./Oct. 1989 issue's Perspectives, "Musselshell Magic."

Montana has moved me since the first day I arrived way back in 1979 (I think). I was not eager to leave when I returned to my home in Florida in 1983.

The spirit of Montana is in me, and it's hard to get rid of. Enclosed is an essay I wrote on Montana because I truly love your state.—*Bob Nichols; Winter Haven, Florida*

I Am Montana

My people are creative, hard working, proud, strong, and free spirited.

I have clear skies—truly you can see from horizon to horizon on any given day. It's as though you can see forever. Skies so blue and sunsets so perfect you may think you have fallen into heaven. I have a big, big sky, and naturally, I am called "The Big Sky Country."

I have wild lands untouched by man. I have battlefields and monuments of men and places, and ghost towns of living places now gone. I have gold and gems, and am sometimes called "The Gem State."

I have cattle, sheep, and horses—even wild mustangs. I have miles and miles of grass, oats, and wheat for man and livestock. White-tailed and mule deer, as well as the majestic elk, love my grazing land. My mountains sustain the aforementioned wild animals as well as big-horned sheep, mountain goats, beaver, and even the hoary marmot. My land produces the "song dog," the coyote; the wolverine; the cougar; the prong-horned antelope; the lynx and bobcat; and the fox. I have skunks, pine martens, fishers, minks, muskrats, chipmunks, ground squirrels, flying squirrels, and rabbits. My meadows give home to the mighty moose. I have bears, even the infamous grizzly.

My mountains carry the Continental Divide on their back. From the Continental Divide, my streams flow in three directions: to the Pacific Ocean, to the northeast into Hudson Bay, and east then eventually south to the Gulf of Mexico.

Canoe my rivers—see the river otters. Catch my colorful rainbow trout, browns, brookies. Cook them over bright glowing coals as ancient peoples did. Feel the freedom as you glide over swift streams. With your paddle still, watch as muley and whitetail graze the banks. Hold your breath and watch. See both the majestic golden eagle and the white-feathered bald eagle glide silently on valley currents. Hawks and other birds are numerous, such as the ever-present magpie who seems to mock you with every dip of the paddle. The magpie will follow you and watch you as you guide your canoe around rocks and limbs of trees that have fallen to old floods.

Feel the freedom! As your canoe swiftly moves out with the fast current, you gaze upon the land. Imagine what John Colter or Charlie Russell may have seen. It's as though you can see an Indian war party galloping over a rise then disappearing into a coulee, or smoke messages coming from the top of one of the many buttes you pass on this journey.

Look at the buffalo—there must be thousands. Much dinner here for the Blackfeet, the Sioux, the Crow, the Cheyenne, the Comanche, and the Pawnee—the plains Indians. Your thoughts gently return to the present. Oh, the freedom your soul possesses in Montana.

In spring and summer, I have sweet pines and I have wildflowers by the millions. In the fall, some of my trees change their colors, but my evergreens do not.

I have told you of my people, my land, and of what is in between. My people are proud people, and we are fortunate to be part of a great nation....

CONTRIBUTORS

• In some of the upper reaches, the Missouri is a world-class trout fishery. Farther downstream, a slower, wider, and muddier river harbors catfish, sauger, sturgeon, and paddlefish. As **Liter Spence** writes, "As might be expected, myriad demands are placed on the Missouri's waters, and wildlife and recreational interests must vie with agricultural, energy, industrial, and municipal uses." The Department of Fish, Wildlife & Parks has requested instream flow reservations in the Missouri River Basin above Fort Peck Dam to protect fish and wildlife, and Spence's article describes the water reservation process. Spence is the water resources supervisor in FW&P's Fisheries Division. Turn to "Instream Flow on the Mighty Mo" on page 2.

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• Crows and ravens are smart birds. In fact, they're the "Brains of the Bird World." **Deborah Richie** continues *Montana Outdoors'* "Nongame Sampler" series with these fascinating bits of information: Crows have learned to break clam and walnut shells by dropping them from high spots onto pavement; ravens dig into the marked caches of mountaineers to find the hidden food. Her article begins on page 7. Richie is the department's nongame information specialist.

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• In the past, the way to "fix" streams for anglers was to plant hatchery fish. But, as **Tom Palmer** writes, "If you've ever wondered where all of America's wild trout have gone, stop looking at the stream and start looking at the stream banks and beyond." An FW&P "River Restoration Program" started in 1989 will ensure about $110,000 per year for restoration projects for rivers and fisheries. As Palmer suggests, the restoration funds are an "Rx for Recovery." His article, beginning on page 15, also presents a run-down of some recent river restoration projects taken up by some of Montana's Trout Unlimited chapters. Palmer is an information officer in the department's Conservation Education Division in Helena.

• Many people equate Montana with trout fishing, but as **Phil Stewart** emphasizes, there is "A World of Fishing Beyond Trout." His article looks at the world of warm-water fishes—sauger, channel cats, paddlefish, and northern pike, to name a few. He tells you what they eat, where they prefer to live, and also explains the department's goals in warm-water fish management. Turn to his article on page 18. Stewart is the department's regional fisheries manager in Miles City (Region 7).

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• A little extra humor is added to this issue's "Readers Respond" section in the form of **Dave McGee's** cartoons. He works as a structural technician for a Great Falls firm and runs D.M. Graphics from his home (4004 Fifth Avenue North; Great Falls, MT 59401). Of his work, he says "Since a child, I have always been fascinated viewing our natural world and the items within it. As for the humorous graphics—I enjoy pleasing people and watching them smile at something I've drawn. Smiles make a hectic day go smoother." Smile when you turn to pages 24 and 25.

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• It's not 1950 any more. The people in town don't know how the landowner feels about the public on his land, and the landowner doesn't know how these folks will treat his property. **Mike Korn** looks to block management as a partial answer. For some examples of block management and how it works, turn to "Old Values, New Times" on page 27. Korn is FW&P's landowner/sportsman coordinator.

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• Researcher Joe Ball is unraveling the relationships between "Ducks and Skunks: Waterfowl and Predation." His research in the Ninepipe area examines how the duck population is affected by predation by skunks. His efforts seem to be paying off: Duck nest success in the study area jumped from 20% in 1986-88 to 44% in 1989. Turn to **Carol Susan Woodruff's** article on page 30. She is a writer and news editor for the University of Montana's Office of News and Publications.

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• This issue's "Perspectives"on page 34 is about "The Return"—the return of **Dellora Gauger** and her father to a favorite hiking area, and the return of the loons. The area has quiet; a deep, blue lake; and trout rising to feed. But its biggest prize is the loons and their compelling calls. Gauger lives in Eureka; she is a public information technician at the Murphy Lake Ranger Station, Kootenai National Forest.

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• "Illegal Aliens" are one of the major problems facing fish managers. In some cases, illegal fish transplants have produced worthwhile new fisheries. But, as **Jim Vashro** writes, "...results are unpredictable, and all too often they have ruined existing fisheries, raised management costs, and caused an overall loss in fishing opportunity." Vashro is the fisheries manager for Region 1 (Kalispell). His article begins on page 35.

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• **Rand Robbin** ranches west of Strawberry Mountain, along Rose Creek, not far from Bigfork. He maintains a printmaking studio there, exhibits his work in regional and national exhibitions, writes prose and poetry, and hunts arrowheads. His poem, "As the Crow Flies," graces our back cover, and we're delighted to set it off with art especially prepared by Livingston artist **Parks Reece**. He is resident artist of the historic Murray Hotel in Livingston (201 West Park Street; Livingston, MT 59047), where he also maintains his studio. Reece does free-lance graphics art—posters, brochures, logos, advertisements, book illustration, and sign painting. His murals cover walls in spots ranging from Sheridan, Wyoming, to North Wales, Great Britain, and his work has been exhibited in galleries across Montana. His back cover piece is titled "Hot Crowmance."

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• *MO* thanks the following photographers for their contributions to this issue: **Jon Cates**; **Chris Cauble** and **Sean Logan**, Helena; **Alan G. Nelson** and **Conrad Rowe**, Great Falls; **Ray Tilman**, Butte; **Paul Updike**, Townsend; **Jan L. Wassink**, Kalispell; and **Mike Aderhold**, **James Connor**, **Mike Korn**, and **Fred Nelson** who work for the department.■

Old Values, New Times

by Mike Korn

MIKE LOGAN

EVERY DAY WE'RE BOMBARDED WITH CHANGE. In Montana, thankfully, that change sometimes comes slower than in other places, but we're affected by it nonetheless.

Not all that long ago, folks in town knew the names of folks who farmed or ranched in the country. We saw each other at the store and at community events, and our lives were intertwined. We knew them and they knew us. So when the sun started to get that lazy fall orange cast and the days grew cooler and shorter, there wasn't any question at all of *if* we could find a place to hunt; the problem was deciding which neighbor to ask.

For the most part, those days are gone. One lifelong Deer Lodge Valley rancher said he hardly knows anyone in town anymore. The faces, the names have all changed. They're as much strangers to him as he is to them. So when fall rolls around and he is faced with people he doesn't know wanting to hunt on his place, it's all different. They don't know how he feels about the public on his land, and he doesn't know how these folks will treat his property. It's just not the same old range.

Yet, in spite of those changes, some efforts are under way to renew old-time values and relationships on which Montanans pride themselves when it comes to hunting. One of those is block management.

The Montana Department of Fish, Wildlife and Parks instituted block management statewide in 1985. It is often referred to as a program when, in fact, it is a tool—a wildlife *and* people management tool. It can provide wildlife managers with the ability to meet harvest objectives (the number of animals that need to be taken to maintain healthy herds, while also staying within the food or forage limitations of an area and reducing damage to agricultural crops) as well as provide hunters with some top-notch opportunities.

The original concept for block management came about in response to a number of situations—most having little to do directly with wildlife. In the late 1970s, many private ranchers in eastern Montana were closing their land to public hunting because of more hunter pressure on landowners, an increasingly stagnant (if not downward) agricultural economy, and changing attitudes on the part of some landowners concerning public use of their land.

Minneapolis, Milwaukee, and other midwestern urban centers are only a day's drive from the shortgrass prairies of eastern Montana. Couple that with significant interest by residents in hunting eastern Montana and you have a seemingly endless blaze orange throng that started showing up in September and didn't let up until after Thanksgiving. Many landowners who previously allowed public hunting grew weary of spending a great deal of time dealing with hunters and not getting to the work they needed to do to prepare for winter. That pushed many landowners over the brink. Some leased their lands to private individuals, clubs, or outfitters. Others simply posted "No Trespassing" signs at the gate and tried to keep up with work on the ranch.

One of the main "types" of block management offered at least a partial solution. It is based on the notion of taking away the need for the landowner to deal with hunters on his property or in some way showing appreciation for the time he or she spends meeting and directing hunters. In eastern Montana, some unique and innovative ideas for dealing with access to private land have become standards on which other states are beginning to base their own programs. The department either supplies personnel or pays the landowner for the time he or she spends directing hunters, filling out permission slips, patrolling property, helping hunters retrieve downed game, and other activities providing some control for the landowner. At the same time, sportsmen get very private, high-quality hunting experiences.

Block Management Comparison 1986-1989

YEAR	LANDOWNERS	ACRES[1]
1986	86	799,360
1987	141	1,692,080
1988	188	2,550,000
1989	346	4,568,868

[1] Acreage figures include public land within the boundaries of each area. However, access to the public land may only be available through the private land participating.

IN WESTERN MONTANA, THINGS ARE DIFFERENT. There is a considerable amount of public (federal) land. Yet, corporation landowners like Champion Timberlands have worked with the department as well as the U.S. Forest Service to establish walk-in-only areas. Walk-ins help to reduce damage to roads from excessive use, while still providing numerous opportunities for big game and bird hunting. These areas are less restrictive because permission slips are not usually necessary. Walk-in areas are, however, patrolled by department personnel to insure compliance with regulations and to provide information and help to recreationists afield. With a minimum number of common-sense regulations, a great deal of land has remained open—or new land has been opened up to the Montana outdoor public.

WHAT HAS BLOCK MANAGEMENT ACCOMPLISHED in the last five years? We can look to some pretty impressive statistics for an answer. The first year block management records were kept was 1986; 29 areas were established statewide with the majority (12) in Region 7 (eastern Montana, near Miles City). That first year, 799,360 acres were included and 86 landowners took part in the program.

A year later, the number of block management areas had more than doubled with 64 operating during the hunting season, encompassing 141 landowners and over 1.6 million acres.

A similar trend unfolded in 1988 in every way except landowner participation. With only an additional 47 landowners involved, the total acreage jumped to 2.5 million acres.

The 1989 Legislature allocated funds for expansion of block management to see what the needs and the interest in this cooperative venture were. Response from both landowners and sportsmen in the 1989 season was straight to the point—the largest gains yet, with 346 landowners involved and 4,568,868 acres of land open to the public for hunting. This increase is underscored by the fact that the department recorded almost 90,000 hunter-days of use in block management areas in 1989 (and some of the areas lack means for counting hunters). That's a lot of use over a little less than three months.

The statistics are impressive, but what do they mean? For one thing, it's obvious

that both landowners and sportsmen support the method, both in concept and on the ground. Landowners appreciate being able to leave the business side of hunting to someone else or at least being recognized and appreciated for allowing public use of their lands. Many landowners have said that block management provides a management tool for wildlife that meshes very well with other management programs and plans on their ranches.

In certain areas where the landowner has in-depth knowledge of the land's carrying capacity for wildlife and livestock, block management is the tool to keep wildlife numbers within a landowner's ability to sustain both wildlife and livestock on the property without abusing the land or choosing one over the other. In areas where game damage has been a problem, block management provides the means of reducing wildlife numbers without hordes of people overrunning an area.

For sportsmen, block management has provided quality hunting experiences and successful hunts, and it has unlocked new opportunities for hunting and other forms of recreation. Some block management areas have opened up not only private land but state and public land as well. Therefore, while addressing a real resource management issue, we are building positive and significant working relationships with people. Wildlife managers of 40 years ago probably would be surprised to see that working with—managing—people has become almost as challenging an issue as managing wildlife in the 1990s.

The future of block management looks promising—but it is also complex. In 1990, interest in the program from landowners and sportsmen is at another all-time high. Acreage statistics are impressive, particularly when one considers that, if anything, the numbers are slightly underreported. Also, citing an acreage figure can be deceiving. To illustrate, a section of land (640 acres) in western Montana may provide some elk or deer hunting. A section in northeastern Montana can be somewhat chancy for deer, but it can be a veritable bird hunter's paradise. So, in fact, sportsmen are probably getting *more* from block management than even the statistics show.

Yet there are limitations. The department only has so much time, personnel, and money that can allocated to block management. There may come a time in the not-too-distant future when a cap may have to be put on block management and perhaps the criteria for involvement may have to be made even more specific to local wildlife and hunter management issues. However, for the time being, block management has worked well for everyone concerned. It is one way of adapting to new times—with a healthy dose of how it used to be. ■

MIKE KORN

RODNEY SCHLECHT

Montana's block management program is unlocking new opportunities for sportsmen, providing wildlife managers with a tool to meet harvest objectives, and helping landowners cope with rising hunting pressure.

DUCKS AND SKUNKS:

–Waterfowl and Predation–

by Carol Susan Woodruff
photos by Dave Books

WHEN JOE BALL BEGAN STUDYING WILDLIFE BIOLOGY, he learned that controlling hunting was the key to maintaining the duck population. Now, after 10 years at the University of Montana, the assistant leader of the Montana Cooperative Wildlife Research Unit knows better. The country's duck population is taking a nose-dive some wildlife managers fear it may never pull out of, and it's clear to Ball and other scientists that hunters aren't the main culprits.

"We have about the same rate of hunting mortality we had back in the '50s and '60s," he says. Hunting, it turns out, is less a factor in ducks' decline than habitat loss and drought. In areas like western Montana's Mission Valley, predation is also a significant problem. Through research funded largely by the U.S. Fish and Wildlife Service (USFWS), Ball is gaining new understanding of duck population dynamics that he hopes can be used to help reverse decades of decreasing waterfowl populations.

USFWS statistics are startling: There were about 6.1 million mallards in 1989, compared with 10.3 million in 1955. Northern pintails hit another record low in 1989: 2.5 million, down from 9.3 million in 1955.

What's caused the drastic reduction in duck numbers? "Recruitment [birth] rates have clearly changed a great deal," says Ball, who for four years has researched the importance of recruitment to the duck population in the Ninepipe area, southwest of Ronan. Assisting him are wildlife biology graduate students Nathan Hall and Denise Pengeroth.

Ducks Unlimited (DU), a non-profit organization dedicated to conserving wetlands for waterfowl and other wildlife, agrees with Ball's assessment of the cause of the decline. "Years of scientific study and evidence from banding programs [point] to reduced recruitment as the reason for today's duck population skid," Managing Editor Mike Beno writes in the fall 1989 issue of DU's magazine.

The University of Montana's Ball says once biologists shifted their atten-

Mallard and pintail numbers have declined sharply in recent years, partially due to heavy nest predation. Above, University of Montana graduate student Nathan Hall checks the incubation stage of a mallard egg on the Ninepipe study area. Duck nests (below) are monitored each May and June to determine if predator control efforts are working. So far, they seem to be paying off: Duck nest success jumped from 20% in 1986-88 to 44% in 1989.

tion from hunting mortality to birth rates, they discovered a disturbing fact: "In many places—in fact, throughout most of the prairie potholes—duck recruitment is in big trouble." The pothole region, historically the continent's most productive duck-nesting habitat, lies in northeastern and north-central Montana; the Dakotas; and southern Alberta, Saskatchewan, and Manitoba. A treeless stretch of rolling plains, it's dotted with depressions formed by glaciers that gather spring runoff and hold it through the summer. The area is the breeding grounds for more than half the continent's ducks, says DU Research Director Bruce Batt.

DUCKS FLOURISH WITH 50% NEST SUCCESS, measured by the number of nests in which at least one egg hatches. They do well with even less. But in the potholes, it's not unusual to have a 10% or even 5% or 4% success rate, Ball says. He adds, "Fifteen percent is about what it takes just to barely keep the population stable. They can't do it at 10 or 5 or 4."

Each May and June, Ball and his assistants monitor nest success. By dragging a chain between two parallel Jeeps, they're able to flush nesting hens and examine the nests. What they've learned is that despite good habitat—dense, tall grass—recruitment has been poor to marginal in their research area, and the main reason is that skunks have been devouring duck eggs at an alarming rate. Elsewhere, predators include coyotes, raccoons, and red foxes. Of all the predators, foxes pose the highest threat to duck populations because they often eat hens as well as eggs.

"Wildlife biologists have always said, 'If you have good habitat, then you don't have to worry about predation,' " Ball says. But "what happens is when you create an island of habitat that's good for ducks, it's also very good for skunks and other things." Small mammalian predators are far more prevalent in the Northwest than they once were. They've adapted well to man's encroachment on wild areas, taking advantage of dumps, culverts, buildings, and grain fields.

"In terms of habitat, we've improved it for skunks and made it worse for ducks," Ball says. "It's a game of hide and seek, and ducks have less and less habitat to hide in, and they've got more and more things looking for them." Indeed, conservationists say man has destroyed more than half the original wetlands in this country. Even more harmed than small wetlands is the upland cover relied upon by ground-nesting ducks, DU says in a report on the duck depression of the 1980s.

"We need to maintain the habitat that we have and, where possible, secure more habitat," Ball says. He notes that the USFWS recently bought 1,548 acres of uplands and wetlands around Ninepipe and that many similar opportunities exist in the area.

Besides habitat loss and an increase in predation, drought has played a major role in the decline in the duck population over the past 10 years, DU's Batt says. Pintails, for example, breed largely in agricultural areas in shallow puddles called sheet water. For the past few years, there hasn't been any, Ball says.

Ball's research focuses on how the duck population is affected by predation by skunks. His research assistants reduce the skunk population by about 12 skunks per square mile. They then examine the skunks' reproductive tracts to see whether the creatures are producing more young to offset the reduction in their population, a phenomenon common among predators.

Like Ball, DU views predator control as effective on a small scale but prohibitively expensive on a large one. As Batt says, "The solution ultimately has to be to change land use." In an effort to boost the duck population, Ball's re-

search team has also placed fiberglass and concrete nests above the water that offer hens a safe spot to incubate their eggs. In some cases, ducks also nest in hay bales the researchers have installed mostly for use by Canada geese.

"We're trying to come up with ways to raise the duck population that are economically acceptable, aesthetically acceptable, and biologically effective," Ball says. Future possibilities include surrounding duck habitat with a low electric fence to keep out skunks and razing unused buildings in which those creatures seek refuge.

Ball's goal is to double the duck population around Ninepipe over five years. "I think we could do it," he says. "There's little doubt in my mind." He has reason for optimism, having played a key role in a recent study that nearly doubled the Canada goose population along the Flathead River over five years. The primary tactic was increasing nest success by erecting artificial nests.

So far, Ball's efforts seem to be paying off: Duck nest success in his study area jumped from 20% in 1986-88 to 44% in 1989. "If we could hold onto 44%, you wouldn't know that valley," he says.

Some people might argue that by limiting duck predation Ball is interfering with nature. But he maintains that man has already interfered with nature by destroying duck habitat. "We've modified the habitat so much that we're simply going to have to manage some areas to favor some species, or we're going to lose them," he says.

Ball's research has drawn praise from wildlife managers, among them Don Childress, Wildlife Division administrator for the Montana Department of Fish, Wildlife & Parks. Childress commends Ball for his careful documentation and ability to put established facts into perspective. "Joe has a very good handle on what the needs are in terms of management and how as a researcher he can help pursue the types of information you're going to need," Childress says. "In a state like Montana, where we have lots of opportunities to manage wildlife, that's a key ingredient we need for the future." ■

Some Tough Questions

• Montana Outdoors *recently asked Joe Ball, assistant leader of the Montana Cooperative Wildlife Research Unit, to further explain his views on how predation affects waterfowl populations.*—Ed.

MO: How would you rate the importance of habitat versus predation?

JB: Habitat clearly is the more basic concern. To put it in mechanical terms, poor habitat is like a broken crankshaft and excessive predation is like a fouled spark plug. Either one can put you out of business, but you can't fix a broken crankshaft by changing a spark plug. That is why wildlife biologists always emphasize habitat so much. In places where huge tracts of grasslands still exist and coyotes—not foxes—are the dominant predator, ducks are doing just fine.

MO: By controlling skunks, are you disrupting the balance of nature?

JB: If a natural balance existed here, our work would not be necessary. Although skunks are a native species in the Mission Valley, current densities are vastly higher than they were historically. Skunks den under buildings, in culverts, in ditch banks, and under rock piles. Most of the things man does tend to favor skunks and handicap ground-nesting birds.

MO: Do you advocate the return of bounties and broad-scale poisoning of predators?

JB: No and no. Bounties are the most wasteful and ineffective technique ever invented. Furthermore, indiscriminate poisoning in the past is one of the reasons that many biologists and much of the general public tend to reject any form of predator management now. Indiscriminate control efforts, if they accomplish anything at all, may bring results that we don't want. If coyotes were removed from the valley, for instance, red foxes almost certainly would take over. That would be a giant step in the wrong direction because foxes are not native and their populations become much denser than coyote populations.

MO: Will skunk removal need to continue indefinitely?

JB: We hope not. We're trying to reduce the carrying capacity of the area for skunks by removing some of the "subsidies" that man has provided in the form of denning sites and food sources. If everything works as planned, the number of duck nests will increase substantially over the next several years, and a sustainable proportion of them will be eaten by a reduced population of skunks. Remember that we can afford to lose well over half the nests to predation while still allowing the duck population to thrive.

MO: Will species other than ducks benefit from this project?

JB: There is good reason to think they will. Numerous species of wetland birds are undergoing population declines similar to ducks. Although some bird species are less susceptible than ducks to excessive nest predation, some species probably are even more sensitive.

MO: Do you consider the project results to be conclusive?

JB: No, but I do consider them to be very interesting, and rapidly getting more so. I hope that we can visit again about this in a year or two.

The Return

by Dellora Gauger

JON CATES

We hiked most of today, my dad and I. Seven miles altogether. We would have been here sooner, but he had to work, just a couple of hours he said. Anyway, those couple of hours ended up being six—and we didn't get to leave until this morning.

Every year in early July, we make this trip. Actually, I look forward to this trip so much that I make it several times a year, in my mind. I go over every inch of our plans, from parking our car at the trailhead, to the long hike in on the winding trail. Then I imagine the quiet, serene forest, the deep blue lake, and watching the trout rise to feed on insects. It's a trip worth imagining. And the biggest prize of the trip—the very best part—is the loons.

Every year, we're never quite sure if they'll be here or not, but so far they have been. I hope this year they will be, too. We've been here a little while now, but no sign of them yet.

My father says they are a very special bird, and they need a very special place to live. They are kind of like some people. They like to be alone. They don't want to be disturbed. They mind their own business and if they are left alone, they will hatch their eggs and raise their young. They mate for life and will often return to the same place year after year.

Loons are very very careful parents, protecting their babies as best they can. They are really wonderful to watch as they swim around the lake with their babies on their backs.

Anyway, today we got here just at dark; it was hard to set up our tent and fix our dinner. I had to hold the flashlight while Dad did the work. Dinner tasted so good after the hike in.

I know I won't have any trouble sleeping tonight. But first I'll lie very quiet in my sleeping bag and listen to the sounds of the night: the wind rustling the trees and bushes, the frogs croaking by the lake's edge, the night birds flying high overhead, their wings whistling as they swoop down on insects, and, of course, the best night sound of all, the call of the loon.

Our hike in to this lake, the beauty of the forest, the calm stillness and deep blue of the water, the special presence of the loon, its call...these all make life in the city a little easier to handle.

Well, it's time for bed, a fog is beginning to cover the lake, and it's very still. But wait, just as I pull my sleeping bag up around my ears, I hear it. Very softly at first, then louder...a loon calling in the night, then another and another.

This will be a good trip; the loons are back and I am back. What more could I ask?■

ILLEGAL ALIENS

by Jim Vashro
photos by Mike Aderhold

IT CAN START INNOCENTLY. At the end of a long day, an angler dumps his bait bucket into the water. Or it can be more sinister. A truck brakes to a halt; the driver steps out and looks furtively around. He grabs a bucket out of the back and in a few steps is at the water's edge. In a moment he dumps the bucket's contents and a new fish species joins the crowd down at the old fishin' hole. And, more often than not, there goes the neighborhood.

Illegal fish transplants are spreading across the state in a mini-epidemic and are becoming one of the major problems facing fish managers. In some cases, illegal transplants have produced worthwhile new fisheries. But the results are unpredictable, and all too often they have ruined existing fisheries, raised management costs, and caused an overall loss in fishing opportunity.

Northern pike, for example, were illegally transplanted from Sherburne Lake to Lonepine (Dryfork) Reservoir near Hot Springs in northwestern Montana in 1953. By 1957, they had arrived at Echo Lake near Kalispell. In the 1970s, pike spread explosively throughout western Montana and are now found in 56 waters in the Clark Fork, Swan, Stillwater, Whitefish, and Kootenai drainages. They have recently been found in the Bitterroot River and Upsata Lake in the Clearwater drainage. This kind of sweeping spread makes fish managers reluctant to introduce fish into new waters, for fear of making them more available to the "bucket brigade."

Although pike have produced popular fisheries in parts of northwestern Montana, they have also in some instances wiped out bass, perch, and trout populations. A recent—and we hope abortive—attempt to introduce pike to Ashley Lake provides a graphic example of how senseless illegal transplants can be. Ashley Lake produces rainbow-cutthroat hybrids of spectacular size, including the current world record of 30 pounds. It would be hard to improve on that fishery, yet two dead pike were recently found there, indicating that someone thought they had a better idea. Pike have also turned up in Tally Lake, the state's deepest lake at 480 feet—hardly typical pike habitat!

Walleyes are highly regarded by anglers, and the Department of Fish, Wildlife & Parks (FW&P) has responded by renovating the Miles City Hatchery to produce walleye fry to supplement existing populations and create new fisheries. However, the Montana Fish and Game Commission recently had to take the drastic and unusual step of banning walleye introductions west of the Continental Divide. Western Montana has a number of lakes potentially suitable for walleyes. But an environmental assessment showed that walleyes have the potential to impact trout and salmon. Experience with northern pike left little doubt that walleyes, if introduced to western Montana, would quickly be illegally spread to other waters where they might become a problem. The neighboring state of Idaho has had to put a moratorium on its walleye stocking program after the fish were illegally moved to a dozen new lakes. The irresponsible actions of a few people have effectively shut down a new fishing opportunity for thousands of anglers. As it is, there are at least two reliable accounts of illegal walleye transplants from east of the divide into the Flathead drainage.

In the 1970s, illegally transplanted northern pike spread explosively throughout western Montana, in some cases wiping out bass, perch, and trout populations.

This is not to say that fish introductions are inherently bad. George Holton, a retired assistant administrator for FW&P's Fisheries Division, is currently writing a guide to Montana fishes. He notes that more than half our present trout species are introduced, as are sunfish, bass, crappie, yellow perch,

and walleye. Montana's internationally famous trout fishing is based on rainbow and brown trout, both introduced. But in some cases introduced fish have been a disaster. Through competition, they have reduced many native fish to "species of special concern" status. Planned introductions now take place only after detailed environmental assessments and lengthy public review.

Violators, on the other hand, need only a bucket. Their actions are illegal, ill-conceived, arrogant, and potentially disastrous. Some of these "bucket biologists" are motivated by fishing success stories from the Great Lakes and lower Columbia River. They want to "have it all" and are impatient with the go-slow approach of FW&P. But they fail to recognize that Montana's pure waters are not as fertile—they can produce only 10% to 20% of the fish these other waters produce.

Following are a few major examples from several hundred documented illegal fish introductions across Montana. There are doubtless hundreds more that have not yet been discovered or that have failed. Incidentally, to dispel a common myth, fish are not carried from lake to lake by osprey or as eggs on ducks' feet. The chances that fish would survive that kind of handling in sufficient numbers to establish a population are nil. Firsthand and secondhand accounts leave no doubt that people are willfully and illegally moving live fish between waters.

Carp (above) were brought to the United States from Europe in the late 1800s. They eat game fish eggs, muddy the water, destroy aquatic plants, and generally make a nuisance of themselves. Suckers (below) are native to Montana, but can cause problems for game fish when they are illegally introduced, often as bait, to lakes and reservoirs.

Western Fishing District

Following up on an offhand remark, FW&P fish biologist Wayne Hadley investigated a pond near Anaconda. To his shock and dismay, he found carp—dozens of them—in a self-sustaining population. Carp were brought to the United States in the late 1800s from Europe where they were highly regarded as food and game fish. American anglers, however, have greeted carp with all the enthusiasm normally reserved for cockroaches. Carp in Montana eat game fish eggs and aquatic insects, muddy the water, destroy plants by rooting on the bottom, and in general make a nuisance of themselves. If those carp in the pond near Anaconda had escaped to the nearby Clark Fork, they could have infested the Clark Fork (all the way to Lake Pend Oreille), Bitterroot, Blackfoot, and lower Flathead river drainages—640 miles of river in all, as well as thousands of miles of tributaries. The damage would have been incalculable and irreversible. Hadley quickly scheduled a "rehab" (chemical rehabilitation or poisoning with the fish toxicant rotenone) to nip the problem in the bud for about $750.

Other problems have not been resolved as easily or as cheaply. For example, goldfish were discovered in a pond at a Missoula golf course near the Clark Fork River a few years ago. Goldfish are close relatives of carp and, when released to the wild, they can grow to several pounds and develop all the nasty habits of their cousins. The golf course paid for several rehabs, but goldfish are tough and they are still surviving.

Rogers Lake near Kalispell is one of four grayling lakes in northwestern Montana. The fish grow to a nice size (14 to 16 inches) and also supply all of the eggs for the state hatchery system. The lake was rehabbed in the mid-1970s to remove illegally introduced redside shiners that were depressing the grayling population. The grayling flourished until four years ago when rainbow trout, brook trout, and yellow perch were illegally introduced in rapid succession. Yellow perch are rapidly reproducing and will eventually eat the grayling into oblivion. Fishermen now catching nice trout and perch are resisting recommendations to rehab, but the lake will soon be full of stunted perch as their numbers exceed the food supply and growth rates drop.

Lagoni Lake north of Whitefish produced nice 16-inch westslope cutthroat in the past. Someone packed in northern pike, and the lake was soon full of "hammer-handle" pike and devoid of trout. The U.S. Forest Service and FW&P rehabbed the lake in 1982 at a cost of $3,000, and the lake once again produced nice trout for three years until pike reappeared. Future management is now in limbo.

Upsata Lake near Clearwater Junction was rehabbed in the mid-1950s to remove stunted yellow perch. The lake produced good rainbow trout fishing for 29 years until the mid-1980s, when yellow perch reappeared and trout plants began to fail. The perch initially grew to 12 or 14 inches and were very popular, but soon stunted out at about five inches. The lake was closed to fishing during 1987 while 1-year-old fish-eating rainbows were being introduced. That plant was followed by a largemouth bass transplant. However, the $16,000 worth of recovery efforts may be stymied, since unauthorized northern pike showed up in 1988.

Some fish get moved long distances. In the last few years, FW&P has discovered bluegills in Tetrault (Carpenter) Lake near Eureka and crappie in Cabinet Gorge Reservoir near

Noxon. Both fish had to come from Idaho or eastern Montana. And, in 1988, fishery crews shocked Woodland Park Pond in Kalispell in an effort to remove what they suspected to be an illegally planted northern pike responsible for the disappearance of most of the park's ducklings. They didn't find the pike but did capture a seven-pound channel catfish—the first one documented west of the divide.

Central Fishing District

Duck Lake on the Blackfeet Indian Reservation was regarded as one of Montana's premier trophy rainbow trout lakes from the mid-1950s through the mid-1960s. Suckers, probably used for bait, infested the lake and soon accounted for 90% of the fish biomass. The competition drove trout size and numbers down dramatically. Starting in 1985, the U.S. Fish and Wildlife Service (USFWS) applied rotenone (a fish poison) to two shallow bays used by spawning suckers and killed hundreds of thousands of them. Ron Skates, a USFWS biologist, notes that "suckers are now less then 10% of the fishery, trout growth rates have doubled, and some rainbow trout are once again growing to seven to eight pounds," but only after an expenditure of $20,000. Skates cautions that the suckers are only *controlled*, not eliminated, and will still require periodic poisoning.

Farther south, another USFWS biologist, Ron Jones, found to his horror a few years ago that eastern brook trout had been moved into Arnica Creek, a tributary to Yellowstone Lake in Yellowstone National Park. Because brook trout have displaced cutthroats wherever they coexist, the brookies posed a threat to all the Yellowstone cutthroat in the lake and drainage above Yellowstone Falls. Jones notes that "the brook trout had the potential to be an ecological disaster" and not just for cutthroat. "Grizzly bears and birds (including bald eagles) use the spring cutthroat spawning run as a food source. Brook trout spawn in the fall and would have eliminated that important food supply." Jones hopes two years of rehabs have eliminated the problem, but he and other biologists are still holding their breath.

Brook trout introductions in the Beartooth-Absaroka Mountains did not end as happily, however. Brookies were spread throughout entire drainages in the 1940s and '50s, and these fish replaced other desirable species such as cutthroat trout, rainbow trout, and grayling.

Buffalo Wallow Reservoir lies northeast of Lewistown in the Missouri Breaks, where good fishing spots are few and far between. This prairie pond produced outstanding rainbow trout fishing until the mid-1980s, when yellow perch showed up. Stunted yellow perch soon replaced the rainbow trout. However, a rehab would require draining the reservoir and losing several years of fishing with no assurance of success.

Canyon Ferry Reservoir is the most popular fishery in Montana. Hefty rainbows and yellow perch provide up to 140,000 days of fishing annually. However, recent fluctuations in the fishery have raised demands for new species, particularly walleye. Concerned about potential competition between walleyes and the trout and perch, FW&P biologists are assessing the situation and gathering public input on future management. However, the recent appearance of several northern pike and walleyes in the reservoir shows that someone is trying to short-circuit the process.

Eastern Fishing District

The eastern fishing district has dozens of small- to medium-sized ponds and reservoirs. As the following examples will attest, a high percentage are subject to illegal transplants, resulting in costly rehabilitation efforts.

Broadview Pond in Yellowstone County was once a very clear pond filled with large crappies. After carp were introduced, the pond became muddy and the crappie population declined. Rotenone treatment in 1983 did not solve the problem.

Ross Reservoir in Blaine County produced good cutthroat fishing until suckers were introduced. The reservoir had to be drawn down and rehabbed.

An experimental gill net set in Bell Ridge Reservoir (Phillips County) captured a 24-inch shovelnose sturgeon. The reservoir is 20 miles north of the Missouri River where sturgeon are normally found.

Illegal introduction of yellow perch ruined a good trout fishery in the Dredge Cut Trout Pond in Valley County. The reservoir was subsequently converted to a warm-water fishery with northern pike, walleye, and largemouth bass. In an ironic twist, a recent illegal introduction of bluegills has severely reduced the size of the yellow perch.

Gartside Reservoir near Sidney has been rehabbed three times over the past 25 years to remove black bullheads, yellow perch, carp, suckers, and pumpkinseed sunfish. More illegal species show up after each rehab, making biologists wary of any further actions.

Krieder Reservoir near Sand Springs was treated with rotenone in 1987 to remove carp and suckers. The reservoir now shows promise of being a good bass pond, but only after expenditure of about $4,000.

America was founded on an open door policy, and our melting-pot culture has been shaped and strengthened by the infusion of various races. Montana's diverse fisheries have grown in much the same way. But illegal aliens now threaten to overwhelm both systems. Anglers need to educate themselves and others about the perils of illegal fish introductions. Live fish should never be moved between waters. And anglers should only use live bait minnows on those few waters where legally permitted. Concerned anglers with information about illegal introductions should contact an FW&P warden or biologist, or call 1-800-TIP-MONT if they wish to remain anonymous. Fines and punishment need to be stiffened to reflect the serious nature of the crime and the damage to public resources.

When fish are planted illegally, all anglers end up paying the bill. Fishing license fees that should be spent on improving habitat and creating new and better angling opportunities must be diverted to cover the cost of rehabs or planting more or larger hatchery fish. New legal fish introductions are postponed or canceled. In some cases, the damaged fishery is beyond repair. Illegal aliens hurt us all.■

AS THE CROW FLIES

The sky gives rise
to eagles, skittish bugs
and a score of red-
hot planes, but
of all the fancy fliers,
the crow's the one
for me.

Coarse and laggard,
rude and profane, they
mate midair, you know—
go straight up
into hammerhead stalls
and dive in full power
spins.

I've watched them
fly chandelles, inside
loops and do barrel rolls
for half a mile—two
birds at a time, just
above the wheat, then
laugh.

Try that sometime.

—Rand Robbin